NOVEMBER, 1938

ELECTRICAL SOUTH

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DIXIE HUNT HOTEL
GAINESVILLE GA
.....
WILLIAM W FAW
PROPRIETOR

GAINESVILLE—scenic and educational center on the main highway between Atlanta and Charlotte — is the popular stopover point for tourists and commercial travelers. Here the famous Brenau College for Women and Riverside Military Institute for boys are located.

Brenau financed and erected the modern Dixie Hunt Hotel under the direction of Mr. Wm. W. Faw.

HUNTER latest 36-inch hotel type ceiling fans in ivory finish are installed throughout the building.

HUNTER Century

HUNTER FAN & VENTILATING CO., INC.

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General Sales Offices: Memphis, Sterick Bldg. *Eastern Sales Office*: New York, 92 Warren Street

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CHICAGO ST. LOUIS NEW ORLEANS PITTSBURGH WASHINGTON

Youngstown Conduit

SELECTED FOR SAFETY OF HUGE HERSHEY ARENA

The Hershey Sports Arena -- the largest span monolithic concrete structure in America -- is unusual in many respects but entirely regular in one. Its electrical circuits are encased in Youngstown Buckeye Hot Dipped Galvanized Conduit. The scheduled amusement of thousands of spectators is not left to chance when electrical systems are safeguarded by this well known rigid steel electrical conduit.

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THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

General Offices - - YOUNGSTOWN, OHIO

26-5A

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YOUNGSTOWN

Sheets - Plates - Pipe and Tubular Products
Conduit - Tin Plate - Bars - Rods - Wire - Nails
Unions - Tie Plates and Spikes

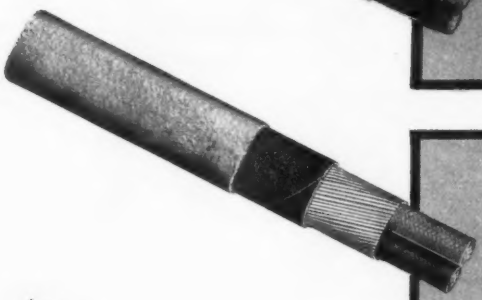
HAZARD

ADEQUATE WIRING SERVES AND SAVES

SERVICE ENTRANCE AND DROP CABLES

SERVICE ENTRANCE CABLE STYLE ABN

costs little, as it may be strapped to house without conduit. May be used with outdoor meter, or through foundation to entrance switch. Concentrically wound uninsulated neutral conductor and closely wound steel tape discourage current diversion.



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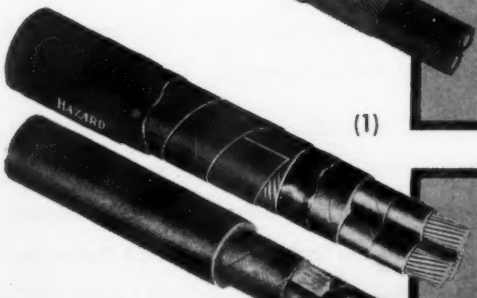
differs from Style ABN, in that the steel tape is replaced by a heavier double-wrapped tape cushion, and that the concentric conductor has more wires giving a closer coverage to make it diversion-proof.

CONCENTRIC DROP CABLE TYPE SD

from pole to entrance cable on house. With single-hole entrance cap and rigid conduit, it is used from pole to meter. The closely wound concentric conductor makes it diversion-proof. Outer braid is finished with battleship grey paint.



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DIVISION OF THE OKONITE CO.

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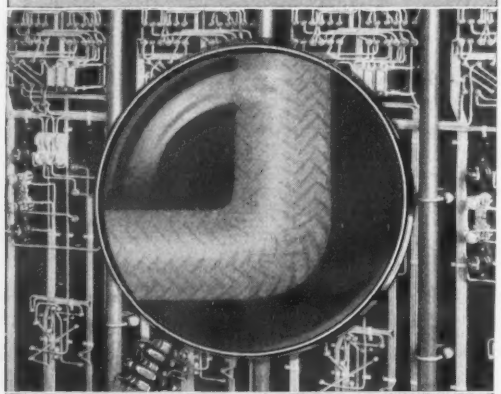
YOU OUGHT TO SEE THIS NEW SWITCHBOARD WIRE!

Flexible tool Insulation doesn't break or crack on sharp bends. That means easier, faster installations and added safety.



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(Listed by the Underwriters' Laboratories)

Yes indeed—you ought to see the new Deltabeston Switchboard Wire. You ought to examine it—test it—translate its features into profitable, lasting service.

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What does this construction mean in terms of your switchboard operation? Protection—because it is resistant to flame, heat, moisture and abuse. Dependability—because it has higher dielectric strength and isn't harmed by sharp bends or severe treatment.

GENERAL ELECTRIC

NOVEMBER, 1938

Volume 18 No. 11

ELECTRICAL SOUTH

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JOHN C. COOK, Sales Promotion Mgr.
W. E. COOGLER, Production Manager

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ATLANTA, GEORGIA

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Published Monthly by
W. R. C. SMITH PUBLISHING CO.
Marietta and Atlanta, Ga.

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...Announcing A NEW LINE OF COLT-NOARK FUSELESS MAIN SWITCHES

- ✶ designed to cut installation costs
- ✶ providing extra space for branch circuits
- ✶ two cabinet sizes . . . for flush or surface mounting

A new line to boost your switch profits

Cat. No. 32N3, showing short cabinet. At right is Cat. No. 35N6F in long cabinet, with space for Transformer and Despard Switch.

Fuseless Main Switches with up to six branch circuits are now permitted by the National Electrical Code . . . and here is a brand new Colt-Noark line of Fuseless Main Switches that come within these specifications. 30 Ampere, 125-250 Volts, with Solid Neutral. They are typical Colt-Noark units . . . compact, rugged, easily installed, designed to provide maximum safety and long life. Note the features at the right . . . then order your stock and get your share of this new business.

Detailed information is yours for the asking. Also send for a copy of our latest catalog 60-S.

Note these Features

1. **Maximum of six branch circuits.**
2. **Permitted by National Electrical Code and listed by Underwriters' Laboratories.**
3. **Front operated Rotor Disc switch.**
4. **With or without provision for both transformer and Despard Type switches.**
5. **Complete interior units easily removed from cabinets to facilitate wiring.**
6. **Flush and Surface type cabinets.**
7. **Plaster adjustments for flush type cabinets.**

100 Years of Manufacturing Experience is back of every Colt Built Product

COLT-NOARK

SWITCHES INDUSTRIAL CONTROL EQUIPMENT FUSES

Boston
New York
Chicago
Philadelphia

Mass Production Methods Applied To Appliance Installations

In his address before the recent annual convention of N. E. C. A., Mr. Geary described unusual arrangements for handling range and water heater installations.

By P. M. Geary
Manager, Steel City Installation Co.
Youngstown, Ohio

THE unusual method of handling range and water heater installations in Youngstown, and the fact that the National Electrical Contractors' Association's local chapter has a member there who specializes exclusively in this class of business, establishes a condition that is new and perhaps different from that which exists elsewhere.

No doubt the first question that comes to your mind is, how can a contractor in a small city like Youngstown secure enough range and water heater installations to make sufficient dollar volume to enable him to recover his overhead and make a profit?

The answer to that question is that the arrangement is such that our company makes all of the range and water heater installations that are made in Youngstown and vicinity and the number of ranges sold there is quite high compared to the number of domestic meters due to the fact that the local utility company maintains a low domestic rate which for many range users is as low as one and one-half cents per kwh, and because this company aggressively sells ranges itself and encourages the dealers throughout the territory to sell them.

Besides the low rate for current the two things that help sales are, the fact that the utility company bears a large part of the cost of the installation regardless of whether the sale is made by its own appliance store or by a dealer, and because it makes its financing plan available to any dealer who cares to use it. During a normal year approximately twelve hundred ranges and about five hundred water heaters are sold in Youngstown and vicinity. As the utility bears most of the cost, all installation orders are received by it, either from its own merchandising department or from the dealer making the sale, and these are turned over to our company forty-eight hours in advance of the time for which the installation is scheduled.

It has for many years been the good fortune of the electrical contractors of Youngstown and vicinity to do business in a community where the electric utility company recognizes the fact that a contracting concern which employs labor and conducts a business with the accepted meaning of that term is a far greater asset to the electrical industry than a journeyman contractor who is engaged merely in selling his own labor to the public for wages. Following this policy the utility has favored

the members of our NECA Chapter with any orders for inside wiring which were under its control.

Prior to September, 1937, orders for range and water heater installations were divided on an equal basis among the members of our Chapter at a price which was agreed upon as a fair price from time to time between the Chapter and the company.

Since any one contractor received only a few jobs at a time, under this plan, it was not feasible for any of them to make any special arrangement for handling these small jobs, and with a wage scale of a dollar and a half per hour, the cost and therefore the selling price did not compare favorably with the price at which this work was being done by journeymen contractors in other communities throughout the county. As time went on this unfavorable comparison grew worse instead of better until it finally appeared as though we were taking advantage of our friends.

This situation caused the officers of our local Chapter to give considerable thought to finding some method of meeting or at least approaching these low prices which prevailed elsewhere.

Special Company Proposed

It was finally proposed and the proposal was adopted that as many of the members of our Chapter as cared to do so should incorporate a company for the purpose of contracting with the utility company for all of the range and water heater installations in the territory served by the Youngstown division of the utility company. It was believed that standardization of materials would permit savings on account of larger quantity purchases, and that specialized production methods would permit savings in the labor cost.

Accordingly, such a company was formed with twelve of the sixteen members of our Chapter as stockholders and a contract was made which established prices for one year for complete installations and for partial installations at figures about 20% less than any which had existed before. A capital investment of approximately six thousand dollars was required to finance the new company, this included the cost of making the necessary alterations to an old building so as to make it suitable for use as an office, shop, warehouse and garage.

Comparison of Cost

At the outset there was some speculation as to whether or not the new company could recover all of its costs and show a profit at these prices, but after nearly a year of operation during which on account of general business conditions the sales volume has been below normal, we are satisfied that it can be done. Our operating statement for the past eleven months shows the following ratios:

Material Cost	29%	of Sales
Labor Cost	27%	of Sales
D.J.E. (Incl. Truck Costs)	15%	of Sales
Total Prime Cost	71%	of Sales
Margin	29%	of Sales
Total	100%	

Interpreted in terms of journeyman labor hours employed (which is the method customarily used in the Youngstown district for the purpose of analysis and comparison), these figures are as follows:

Material cost per journeyman hour	$1.61
Labor cost per Journeyman hour	1.50
D.J.E. cost per journeyman hour	.82
	$3.93
Margin per Journeyman hour	1.55
Sales Billed	$5.48

Since both journeymen and helpers are employed on their work we obtain the number of journeyman hours per job by dividing the labor cost by the journeyman's rate which in Youngstown is $1.50 per hour.

Prime Cost Reduced 30%

Our company's prime cost for a complete range installation is approximately 30% less than the average prime cost of the various contractors who were doing this work prior to September, 1937. The savings effected have been about equal in both material and labor while the records show that our company has had a small increase in direct job expense, but this increase is explained by the fact that our truck cost is allocated to each job as a direct job expense instead of being absorbed in general overhead as was being done by the other contractors.

The savings made in material cost is due to quantity purchases, and to the fact that material prices in general have been lower during 1938 than they were during 1937.

The average labor per complete range instalation has been reduced from eight to five and a half journeyman hours. Several factors are responsible for this:

First. Standardization of materials and methods. The same type of wiring material is used on every job and, the same installation method is followed in so far as the construction of the building will permit.

Second. The same men are employed as far as is possible. When the same mechanic works on the same kind of work day after day, handling the same materials and following the same general installation method he becomes an expert and finds for himself many short cuts and time savers that his employer would never think about.

Third. A journeyman and an apprentice work together. After an intelligent apprentice has worked for a few weeks on this class of work he can while under the supervision of a competent journeyman do the rough and arduous part of the job, thus permitting the journeyman to conserve his energy for the parts of the work requiring more skill and experience. Of course, since the apprentice receive a much lower wage rate the hourly cost per crew is reduced.

Fourth. Transportation equipment. The territory served by us has a radius of approximately fifteen miles while our average truck mileage is nine miles per job. Each crew (journeyman and helper) is provided with a ½ ton truck equipped with a steel body especially designed and built to order for the purpose. The trucks are of the covered body type equipped with ladder racks, conduit racks, vise support, hooks for coils of wire and cable, and bins and compartments for storing separately, so that they are readily accessible, each of the different kinds of fittings and devices required. It is never necessary for a crew to come back to the shop for anything. This method reduces traveling time to a minimum, and being well and properly equipped gives the mechanics an

(Continued on page 48)

Merchandising

IN THIS SECTION:
Novel Ideas to Promote Christmas Sales
Key to Laundry Equipment Sales
Personal Service Builds Profitable Volume

Knoxville Dealers Expect Increase In Sales . .

ELECTRICAL appliance dealers have been expanding, increasing their stocks, and uniting in extensive advertising at Knoxville, Tenn., in anticipation of unusual sales increases. Their action follows sale of the Tennessee Public Service Company's system to the City of Knoxville and Tennessee Valley Authority.

The system served 25,408 residential customers, 3,287 commercial, 338 industrial and 1,054 farms. Besides Knoxville it takes in such East Tennessee towns as Sevierville, Dandridge, Newport, Rogersville, Maynardville, Luttrell, Corryton, Jefferson City, New Market, and others.

East Tennessee Electric Company retail store has moved into a larger building on Gay Street. R. D. Anderson, manager, said his company has increased its stock of ranges, water heaters, and other appliances.

Ernest Fielden at Fowler's estimated that appliance sales of Knoxville dealers will be boosted "at least 25 per cent." He said that Fowler's "is the only Westinghouse distributor in the United States who is ahead of last year's quota, and this year we are already 140 per cent ahead of this year's quota."

Knoxville Outfitting Company has stocked a wide range of ranges and refrigerators, said Glenn Palmer.

Knox Dry Goods Company rearranged a floor to add a complete line of electrical appliances, with Dave Borriss as manager, according to Joe Hurley, store manager.

Maxwell's, Vine Avenue, laid in a full line of heavier appliances, Lester Maxwell said. A demand for ranges especially was anticipated.

Woodruff's are increasing sales after making preparations, according to W. W. Woodruff, Jr. Trained experts are employed to give free service to housewives in the area, especially in kitchen planning.

Walker's Gay Street, also put in a stock of appliances, Joe Walker said.

Miller's is featuring ranges, announced F. L. Thomas, head of the electric appliance department.

Electric Home Servants Company was organized in anticipation of a large volume of business. Zeno Brown, manager, expects a big increase in sales of air circulators next year.

George's "tuned up our electric appliance and service organization" and put in complete lines of all appliances, said Frank Oates, appliance department manager.

Oil Burners and Coal Stokers Eligible for EHFA Financing

IN response to many requests, Electric Home and Farm Authority has included conversion type oil burners and coal stokers in its list of equipment eligible for financing. Eight burner manufacturers' products and six stoker manufacturers' units have been approved for financing at the present time. Other manufacturers will be added to this list in the near future.

Following are the terms that apply to the financing of oil burners and coal stokers: finance charge, 5% per year on the original amount financed; minimum down payment, 5% of the installed price; maximum terms when sold individually, 36 months. (When sold in combination with another appliance on the EHFA list that is eligible for 36 months, the contract covering the sale of both appliances may be drawn for a maximum of 48 months).

The same customer contract that now is being used for financing other appliances through EHFA should be used in financing oil burners and coal stokers. The Authority directs attention to the fact that complete furnaces are not eligible for financing. Contracts covering the sale of oil burners and stokers will be accepted for financing effective immediately.

The addition of oil burners and coal stokers to the list of eligible equipment will be very helpful to all dealers selling such equipment, particularly at this time of year when many installations are being made for the winter.

Appliance Sales Trend Continues Upward .

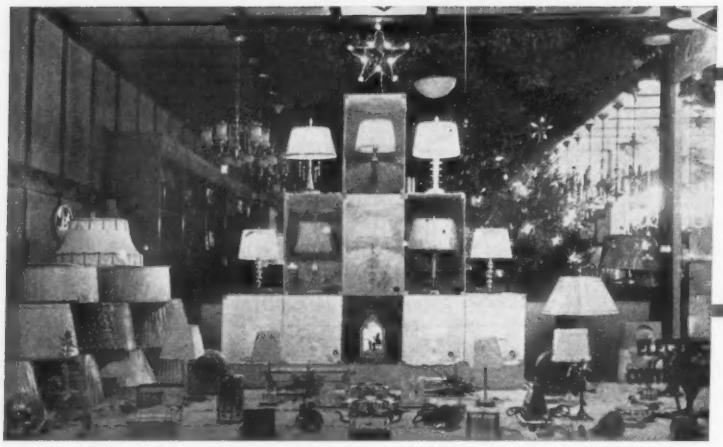
SURPASSING the predictions of the industry's most optimistic prognosticators, August shipments of household washers zoomed to a total of 129,163, increase of 74.49 per cent over July, and within 13 per cent of the August, 1937, total.

"Warehouse and dealer stocks, which were high everywhere when buying slowed down, have become exhausted," J. R. Bohnen, executive secretary of the American Washer and Ironer Manufacturers' Association, said today. "Retail sales took an upturn in midsummer and have continued strengthening in all sections.

"August was the highest month our industry has enjoyed since September, 1937. Stimulus given trade by promotion of National Washer and Ironer Week, October 23-29, is counted on to keep shipments at high figures through the fall months, which will reverse a normal seasonal downtrend."

Ironers shipped in August to-

(*Continued on page* 16)



Show windows should be utilized to the greatest possible extent during the weeks just preceding the Christmas holidays. This window of Dawkins Electric Co., Memphis, Tenn., featured lamps and small appliances.

NOVEL IDEAS CHRISTMAS

FOR the electrical appliance retailer the Christmas shopping season is not only the one time of year when aggressive sales promotion effort is practically certain to bring worthwhile results; but it is also the one time of year when a dealer can scarcely expect to get his portion of the seasonal business without such effort.

The Christmas shopper does not often have any specific item in mind. He is looking for suggestions. He gives more careful attention to displays. He scans the advertisements of gift merchandise. He is more receptive to suggestions from sales people. And unless the appliance dealer plays up the fact that it is headquarters for Christmas gifts, features the many items in stock which will make most acceptable gift items. Mr. John Public is likely to pass it by in favor of other stores.

So the appliance store needs to "dramatize" the fact that it should be among the first stores to be visited by the Christmas shoppers. In this connection it is usually worth while to give the store something of the Christmas atmosphere with holly, mistletoe, Christmas bells, crepe - paper streamers, and perhaps a decorated Christmas tree in the show window or inside the store. All this helps to create the impression that the store is headquarters for Christmas merchandise.

This is the one time of year, too, when the show windows should be utilized to the fullest possible extent. At other times of year they may receive but scant attention from those who pass by the store; but during the weeks between Thanksgiving and Christmas, the pedestrians walking down Main Street of any town or city are looking eagerly into the show windows for suggestions which will help solve that annual problem of selecting appropriate gift items.

In the following paragraphs are a number of holiday merchandising ideas that have been used successfully by other dealers. Many of them require only a small amount of planning and minimum expense and yet may provide profitable sales opportunities.

* * *

Use heating devices, clocks, and other small appliances as leaders in window and near-the-door displays. These low priced items can be used to get people into the store. Once inside they are very likely to become interested in a larger appliance and end up by spending five times more money than they originally intended to spend. Also, people outside, seeing traffic inside the store are humanly inclined to come inside, thus giving to the store a prosperous and business like holiday atmosphere.

* * *

One of the most effective ideas ever used by one large dealer was a combination newspaper advertisement and a window-display featuring that advertisement and the merchandise offered. Same copy was used in both, "Electrical Gifts—The Ideal Gifts—Under $5.00," was the banner line over a layout of squares each of which contained an illustration of the suggested item and a brief description.

* * *

"Use radio time generously," one Southern dealer advises. "And use it economically. This is one time of the year when almost every woman keeps her radio tuned in deliberately seeking suggestions for gifts. Spot announcements between programs calling specific attention to some very unusual and desirable item will suggest it as a gift to that woman and she will visit your store in quest of the item; perhaps to buy more."

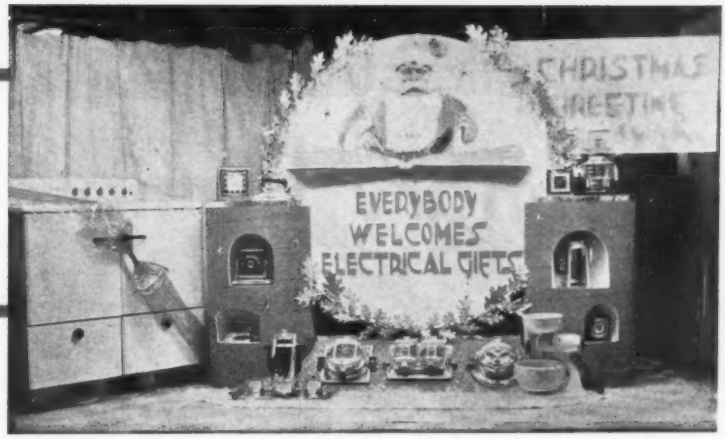
* * *

Using the most economical type of direct-mail advertising, another dealer has hit upon his most effective promotional stunt with the use of penny post cards. The message side of the card is ruled off in columnar fashion and suggests the name of the gift receiver, the item and the price. The two columns that deal with item and price suggest specific gifts for men and women from the store with open space for the customer to insert names.

* * *

Many electrical stores enjoy a rush on forgotten Christmas gifts at the last few hours of the shopping season, and each dealer can cash in on this popular failing by staging a "Last Minute Sale" that offers some interesting inducements over the regular seasonal showings. The sale should include a variety of different priced merchandise to meet the taste and purse of every shopper. The special merchandise should be

TO PROMOTE BUSINESS



Christmas decorations in this window of the Birmingham Electric Company leave no doubt that the specially featured small appliances are presented as gift suggestions. Major appliances, too, are on display.

placed in a prominent place in the store and have price markers designating the various price ranges that are grouped around the marker.

* * *

It is usually a good idea to place the traffic merchandise at the head of the store during the Christmas buying season; preferably in the front center so as to speed-up traffic through the store. A "Dollar Table" should be considered and the merchandise grouped together in this assortment. This will save salespeople time and get customers into and out of the store more rapidly.

* * *

The problem of many dealers is to get the maximum number of their regular customers into the store while they are still looking for gift suggestions. One dealer accomplished this by holding an open house. Invitations were sent only to regular patrons with the comment that they were being given first opportunity to view the store's complete gift line. The appliances were grouped on tables scattered through the sales room where those who attended could examine them closely. Demonstrations were made of cooking appliances, and sandwiches and coffee were served to the observers. Of course, the sales force made every effort to close sales.

* * *

Here are valuable routine suggestions to remember during the rush season: (a) Remember that the store will operate better if everything has a place and everybody knows where it should be. (b) Have large signs in the store guiding shoppers to particular departments. (c) Work out a stock technique for filling in stock and a system for selling from stock samples on the floor.

Don't overlook the profit possibilities in the numerous manufacturers items packaged especially for Christmas merchandising; many items not in the regular lines of the store. Many dealers profit by erecting a display of these items headlined with this suggestion, "Here are the special Christmas packages designed by experts for your gifts," and therein displaying the numerous Christmas packaged items and sets from every department of the store.

* * *

Don't forget the Gift Certificate business. There are always hard to please customers and they have hard to please friends. The Gift Certificate offers the ideal solution. When a salesperson runs into a customer who cannot be sure whether the friend would like a specific item the gift certificate should be the ready suggestion.

* * *

One merchant has a policy of displaying strictly Christmas goods (tree lights, etc.) on the inside circle of the counter during the early part of December. They run around the whole display independent of the grouping of the rest of the goods. During the weeks just preceding Christmas the goods are moved forward to the front of the counter while the regular and seasonal merchandise goes to the middle and back of the display.

* * *

It is of course, desirable to spread out the Cnristmas sales season over as long a period as possible. Where it is all concentrated in just the last week or two before Christmas, it is a hardship on the sales force and, in the rush of trying to wait on the crowds, many sales opportunities are missed.

For this reason it is usually considered desirable to start the advertising, the displays and the other special promotional efforts by the first week of December at the latest. Advertisements may be used to stress the fact that stocks are complete and that better selections are possible, at that time. It may be desirable to offer to wrap the packages at the time and lay them away until they are called for later in the month; or perhaps offer to deliver the packages just before Christmas, if desired, or carry the charges over to the following month's bills.

The average appliance store may be made a real Christmas store with just a little special effort in the way of selection of stock, advertising displays, and suggestions from the sales force. And this special effort is well worth while. For many stores it transforms an otherwise average, or even dull, month into one of the very best months of the year from the profit point of view.

Demonstrations Are the Key to Laundry Equipment Sales

ECONOMISTS agree that the South today is America's last frontier for economic opportunities. It is just as true that the southern market today for home laundry equipment is the *number one* opportunity field in the electrical appliance industry.

That the southern market for home laundry equipment is larger than any other, in point of new first-sale potentialities, is not a loose statement. It is a statement of fact backed up by statistics. Electrical appliance dealers can put these facts to the test with profitable results.

More and more women in the South are finding out that they can have their laundry work done at home with modern equipment. They are learning this fact from neighbors and friends who have home laundry equipment, and from the various media of advertising used by the leading manufacturers of washers and ironers.

It is a fact that probably nowhere in the United States was sales resistance to home laundry equipment, especially washers, so firmly intrenched as in the South. But negro washerwomen were, *not are,* formidable opponents to laundry equipment sales.

Those days are past. The "laundry-at-home" movement is growing daily. It is up to the electrical appliance dealer to take advantage of this natural growth for the benefit of his own pocketbook.

Untouched Opportunities

Although the low sales saturation of laundry equipment in the South is an advantage from the viewpoint of untouched sales opportunities, it is a disadvantage so far as getting the "home laundry equipment story" to every housewife. Accordingly, dealers must not miss a single opportunity to present their equipment to the public. In their advertising and in their stores they must keep electric washers and ironers in the foreground in order to gain public acceptance for them.

THIS is the last of a series of articles adapted from addresses presented before dealers and salesmen of the Atlanta Electrical Association on the sales promotion problems of various major appliances.

J. A. Gazelle, district manager, Easy Washing Machine Co., and Mrs. G. R. Edwards, home service department, Georgia Power Company, were the principal speakers at the meeting upon which this article is based.

They must let passersby know that they have laundry equipment to sell by giving it the place it deserves in the front of the store and in windows. Too many dealers arrange their displays as though they were in the storage business, with washers and ironers tucked away behind posts or lines of refrigerators.

The entrance to the store, the sidewalk by side show-windows; these are the places to show washers if they are to be sold.

Why not say now: "I am going to give this product the place it deserves. It is something new. There are not many of them sold. We want to get into this business. There is a golden opportunity here because there is less than ten per cent saturation in the southern field, and because of the fact that there is less than ten per cent saturation, more people should see the products and we dealers should emphasize home laundry equipment."

Many dealers think that in order to sell home laundry equipment they must sell the lower priced units. This is a fallacy. In fact, you can sell the higher priced units more easily than you can those priced at $59 and $69. It is easier to sell a washing machine for $169 than for $69 for the simple reason that you have more to sell. In other words, in the $169 unit you are selling service not price. There is just as much, if not more, profit as in selling refrigerators if—*you will sell service and not price.*

There is a marvelous story in home laundry work—if you will tell it, and sell it, to the housewives.

Ladies have always been accused of discussing children, operations, beauty treatments, clothes and whatnot at their parties, bridge games, and teas. But today these discussions are centering more about modern day problems and modern methods of living. Naturally any discussion of modern day living must come around to modern electrical appliances. Today women are discussing electrical appliances they have either recently purchased or intend to buy.

Housewives Are Interested

A high executive in the electrical industry recently said: "I happened to be talking to a group of ladies not long ago concerning home laundry equipment. There were about thirty ladies in the group, and four of them had washers in their homes. After the meeting was over, I tried to arrange a few demonstrations, but these ladies seemed to know as much as I did about washers and ironers. Yet they had not had demonstrations.

"They had learned about washers and ironers by talking among themselves and with their friends. It made me make the statement, and it is one which I still make and which I cannot emphasize too strongly, that the men in the electrical appliance field are not

TRUMBULL *Control*

"T.M." *line* . . MANUAL MOTOR STARTERS . . "T.T." *line*

When you're looking for compact, attractively designed and thoroughly dependable manual starters for small motors you'll need to go no further than these three well-known Trumbull Lines. For the smallest class of motor driven shop, office and home equipment select Type "TT" (Thermostatic Tumbler). For motors up to 2 H.P. select "TM 2," in compact rounded corner boxes with front tumbler switch operation. And for motors up to 7½ H.P., select "TM 7½" with either front tumbler switch operation or regular side switch handle.

Either one of these fine manual starters will assure you full, accurate and dependable motor protection against overload. Interchangeable relay heaters provide correct ampere ratings for every installation. There are no parts to be replaced when the starter trips . . . no complicated parts needing maintenance. All three starters will stand heavy starting load but will always trip on overload before damage occurs. Every provision has been made for easy installation, wiring and changing of heater units.

You'll find, too, in every detail of the construction of these starters the hall mark of Trumbull quality in design and workmanship. A Bakelite case encloses the entire Type "TT" mechanism, for example. Types "TM 2" and "TM 7½" feature the same type of duo-break contacts as on Trumbull Magnetic Starters, eliminating burning of contacts and assuring a positive make and break. Single moulded base of the entire starter mechanism is saddle mounted for ease in wiring. All live parts are visible and removable from the front, with straight through wiring. Available in forms for flush and "built-in" mountings and in cast iron boxes ("TM 7½" only). Group fusing heaters are also available for special applications.

Trumbull Manual Starters will be further illustrated and described in the November issue of Trumbull "Cheer" . . . the interesting monthly that now goes to 30,000 electrical men. We shall be glad to send you a copy and place your name on this list.

The TRUMBULL ELECTRIC MFG. CO.

PLAINVILLE — A GENERAL ELECTRIC ORGANIZATION — CONNECTICUT

selling washing machines by demonstration. Instead, they are letting the ladies do the work."

But home laundry equipment dealers cannot depend upon this method of selling their product. They must demonstrate to sell!

Demonstrations Will Sell

Demonstrations will sell home laundry equipment. This is true of the washer to a greater extent than almost any other electrical appliance. Never let a prospect get away without making every effort to stage a home demonstration. Once you get permission to give a demonstration more than half the battle is won.

It is true that in about 85% of all cases the housewife is spending enough money for laundry work to make up the payments on a washer and ironer. A demonstration in the home will prove this to the average housewife. Satisfied users will testify that clothing will last a third longer by the use of the washing machine in the home than by any outside method. It is a fact, and one that should be broadcast to every prospect, that the washer and ironer consumes only a small amount of electricity and runs up the electric bill least of any major appliance.

A prospect may say she can get her washing done for a few cents each week by a negro washerwoman. Dare her to allow you to do the same laundry in a modern washer. The amount of dirt that will come out of the second washing will be a revelation that cannot help to break down this type of sales resistance. Then point out that she does not know under what conditions her laundry is being done when it is sent out.

In talking about and demonstrating a washer the average woman wants to know many things. She wants to know how much extra work will be involved if she does her washing at home with modern laundry equipment. She wants to know how much trouble it will be and how much she will be able to save.

She wants to know, perhaps most of all, how much the equipment will cost her, how long it will last, whether or not it will require much attention in the way of repairs and upkeep. *And of course, she will want to know how her clothes are going to look.*

It is up to the dealer and the salesman to inform the prospect about these things in a manner that will be satisfactory to the prospect and result in sales for the dealer.

These questions can best be answered by a demonstration. The best place for a demonstration is right in the prospect's home. That is the place to tell the housewife, and in telling them there, you will be selling them there too!

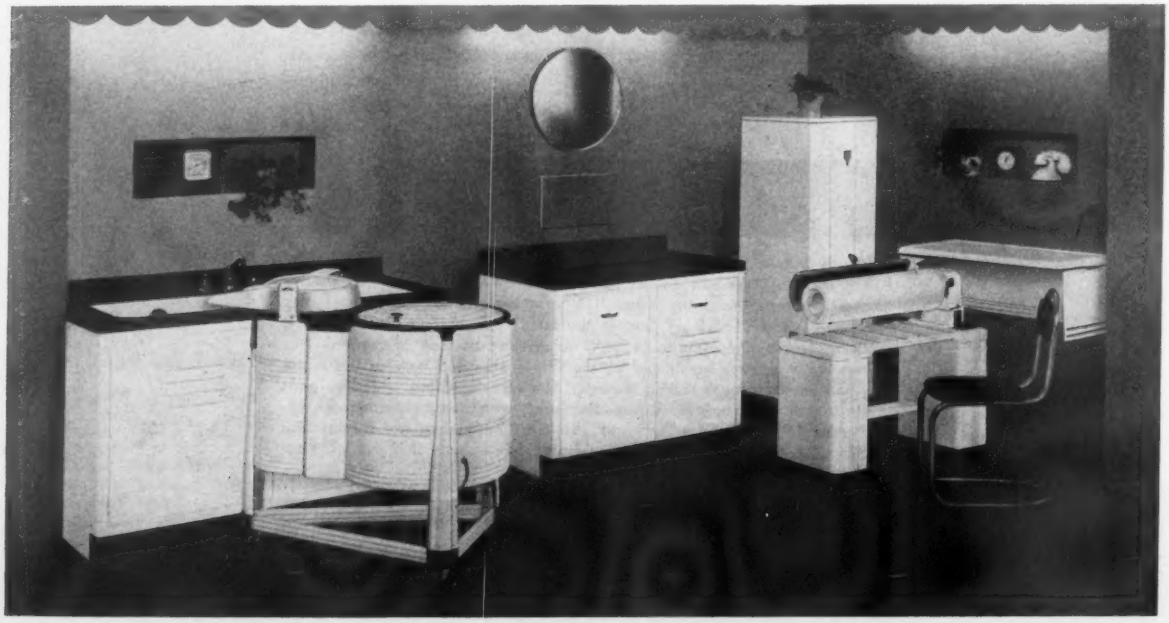
Monday is of course the best day on which to hold your home demonstration. However, there is no reason why you could not have three or even four demonstrations going on at one time. You can divide your time between them and, of course, should work one neighborhood at a time. If you do have a demonstration on a Monday in a home where the tub method has been in use, it will provide an excellent opportunity for comparing the new method with the old.

Regardless of the day of week there are a number of things to remember in connection with a home demonstration of a washer.

Mind The Small Details

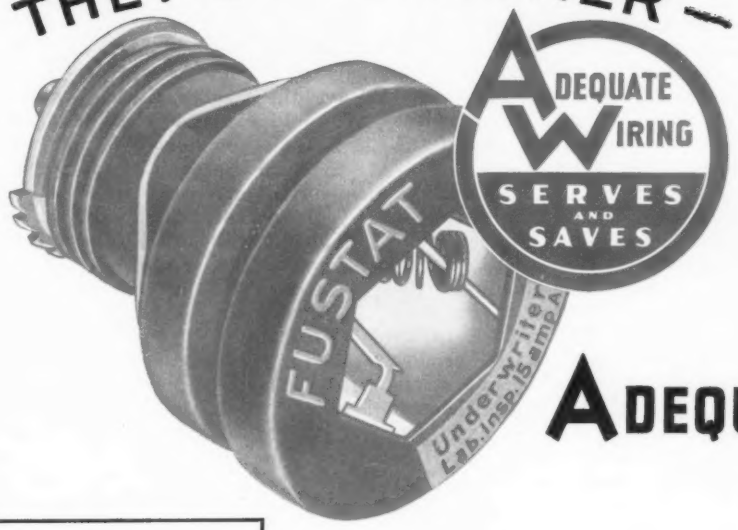
It is a good idea to carry a package of your prospect's favorite brand of soap flakes. Find out if the water needs a softener and if the prospect uses bluing.

Always carry wiping cloths to use after the demonstration and also some extra fuses and an extension cord which may be needed if an outlet is not near the spot selected for the demonstration.



"Too many dealers arrange their displays as though they were in the storage business with washers and ironers tucked away behind posts and lines of refrigerators. If they are to capitalize upon the profitable market which is rapidly developing in the South, they must give laundry equipment the display it deserves."

THEY GO TOGETHER —



The FUSTAT helps bring ADEQUATE WIRING more quickly

What is the Fustat?

This remarkable device is a fuse to which a thermal cutout is added.

It gives all the protection of a fuse of the same size against short-circuits — even high resistance shorts such as occur in flexible cords.

It protects against permanent overloads, even when as light as 25%.

Yet it will not blow on motor starting currents such as are caused by washing machines and other appliances.

It has a non-tamperable base that protects the user against anyone robbing the circuit of protection through haphazard practices.

It fits in any Edison base fuseholder through the use of an inexpensive adapter that locks in place

Adapter retails at 7½c

Adequate wiring means —
more circuits installed

The Fustat prevents permanent overloading of the circuit. When additional circuits are needed the user cannot readily side-step the issue — at the sacrifice of safety.

It is practically impossible to replace a Fustat with any kind of a substitute — nor can it be replaced with a size too large to protect.

Adequate wiring means —
more outlets per circuit

The Fustat permits adding a maximum number of outlets to the circuit. The circuit cannot be overloaded regardless of the number of outlets. Hence adding extra outlets is a perfectly safe practice.

Adequate wiring means —
more satisfactory operation of appliances

The Fustat prevents low voltage conditions that so frequently cause dissatisfaction with appliances — because the Fustat keeps users from loading circuit beyond the proper capacity of the copper.

Adequate wiring means —
more appliances in use

The Fustat permits adding more appliances to a circuit. It doesn't blow on motor starting currents or other harmless overloads. The circuit can be loaded to approved capacity without needless blows — and without sacrifice of safety.

Adequate wiring means —
more consumer good will

The Fustat builds good will by eliminating many annoying service calls — it doesn't blow needlessly.

The Fustat prevents loss of good will that often results from fright or expense caused by flexible cord shorts burning out. The quick action of the Fustat on such dangerous "household shorts" prevents spraying of molten metal, starting of fires, burning of users. The Fustat assures safe protection that remains safe.

The Fustat stops scare headlines and stories that blame fires on so called "defective wiring". The Fustat opens quickly even on high resistance shorts. Every Fustat installed means that much less chance of scare headlines making users think electricity is dangerous.

It's just good business to sell, install and use Fustats

The FUSTAT

Retails at 7½¢ in 15 to 30 amp. sizes

For full information write to any of these firms

BUSSMANN MFG. CO., University at Jefferson, St. Louis, Mo.
JEFFERSON ELEC. CO., Bellwood, Ill.
KIRKMAN ENGINEERING CORP., 121 Sixth Ave., New York City
NATIONAL ELECTRIC PRODUCTS CORP., Fulton Bldg., Pittsburgh, Pa.
UNION INSULATING CO., 27 Park Place, New York City

It is always advisable to have your prospect soak the clothes overnight. Overnight soaking loosens up the dirt and makes them easier to wash. Then see to it that the clothes are sorted in this way: first, fine white linens; second, other white goods; third, colored fabrics; fourth, silks, woolens and hose; and fifth, handkerchiefs. These latter items require special attention and should be washed separately.

Know Your Temperatures

Explain to the prospect what water temperatures are best suited for the different fabrics. Woolens, rayons and silks should be washed and rinsed at a temperature of from 90 to 100 degrees, F. Extremely cold or hot water will shrink woolens. For unfast colors the water should be between 85 to 95 degrees, F. For cotton and linens the temperature should be between 120 and 150 degrees, F. The rinse water for cotton and linens should be between 100 and 105 degrees, F.

While the clothes are in the washing machine, you should explain all about the operation and the mechanism of the product. Advise your prospect about the lubrication features, the hoseless features, the ease with which the washing is done, and the economy of the modern washer.

After the clothes have been washed and rinsed, you might offer to prepare the starch for the prospect, for her use after you leave. Although this procedure is not an actual step in the demonstration, it will leave a very favorable impression and pave the way for future sales—perhaps that ironer which the prospect hopes to buy along with the washer, or at a later date.

The best method in preparing starch is as follows: Mix one-half cup of dry starch with one cup of cold water. Add two quarts of boiling water, stir slowly all the while, and then heat over a slow fire for about five minutes. After the starch has been heated remove the scum from the top and strain it through a sieve. Then keep it heated until it is to be used. The finished starch should pour in about the same manner as heavy coffee cream.

Working Up To The Close

Demonstrate the proper way to clean the washer to your prospect. Show her how important it is that it be wiped and cleaned thoroughly after each time it has been used. Explain what guarantees are made with the sale of the product. In other words, after the actual demonstration has been completed, you are then ready to work up to a "close." The final step is to summarize the highlights of the presentation, as a preliminary to the final try for the order.

A time-proven way to make the final question for the order is to ask for it in such a way as to leave no opportunity for a "no" answer. This can be done by saying, "Would you like me to leave the washer in this corner or would you prefer me to place it in the other room?"

Such an approach has a disarming effect and nine times out of ten the prospect is so far sold by the demonstration that she replies automatically. Thus the prospect has virtually admitted that she is going to keep the equipment.

From this point on you must not take any chance of losing the order so another question of the double type is advanced. Instead of saying "Would you wish to pay cash," you should ask:

"Will you want to pay cash or would you prefer time payments better?"

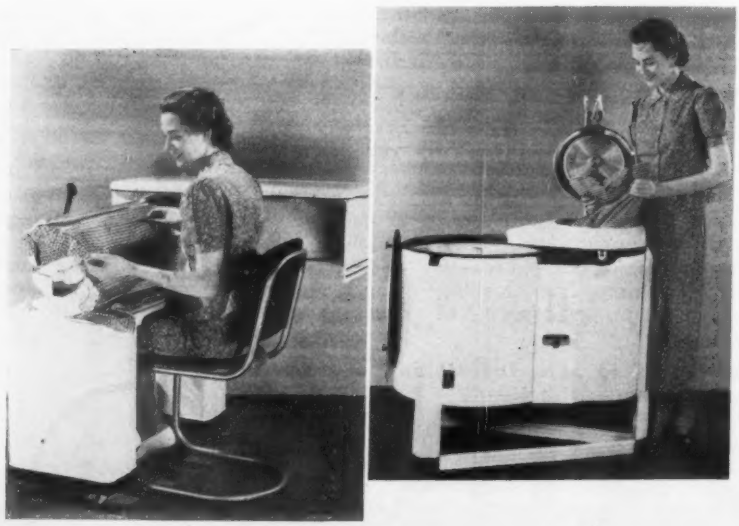
Without hesitation, the prospect probably will select one method of payment or the other, and the sale is closed.

Throughout a demonstration it is important to ask leading questions and thus determine just how the prospect is reacting to each step in the demonstration. If this is not done there may be some one thing which may have influenced the prospect against buying—and unless the salesman knows what this is he is under a severe handicap.

After all there should be nothing difficult in selling a modern washer or ironer.

There are five buying decisions which a prospect makes before she buys a washer. To make them she has to answer to herself the following questions: 1. Does she need a washer? 2. Does your product fill the need? 3. Can she get the service and cooperation that she wants from your company? 4. Will she get benefits and service from your product commensurate with the price involved? 5. Is the present time suitable for her to buy?

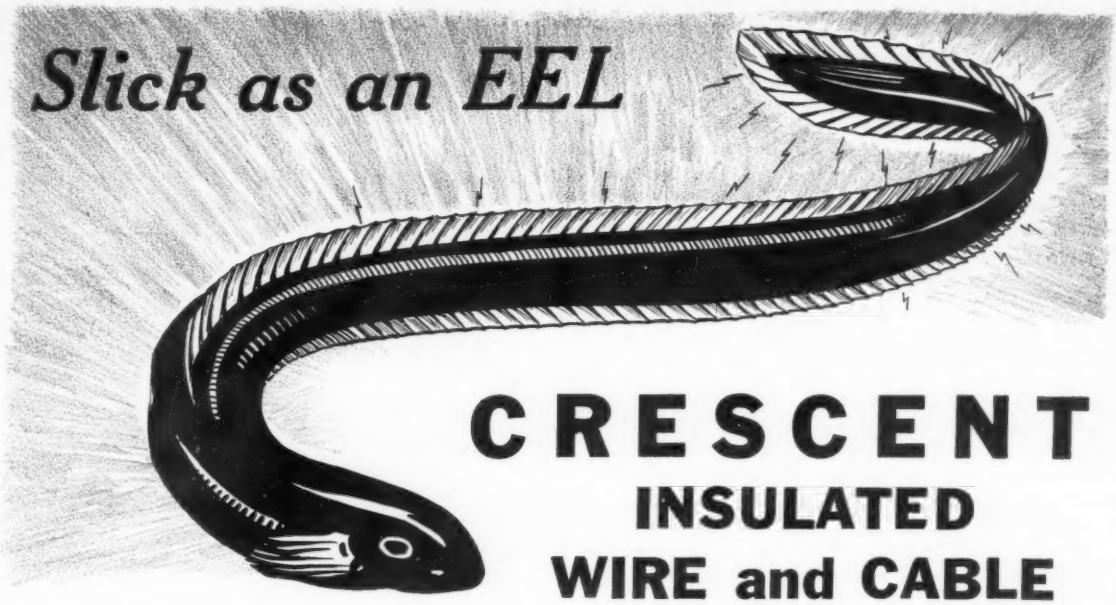
Determine which buying decisions your prospect has already answered favorably in her mind. Concentrate on the others by proper explanation and a proper home - demonstration of your product. You will find washer and ironer sales one of the most profitable items in the appliance line; and in the southern market thousands of prospects are merely waiting to be sold!



Experience of hundreds of dealers proves conclusively that demonstrations will sell home laundry equipment. Once the prospect has had the opportunity to see for herself what can be accomplished on these gleaming new models, the difficult part of the sale is over.

VARNISHED CAMBRIC CABLES • RUBBER POWER CABLES • BUILDING WIRE • RADIO WIRES • SIGNAL CABLE • FLEXIBLE CORDS • LEAD-ENCASED AND PARKWAY CABLES • ARMORED CABLE

CRESFLEX NON-METALLIC SHEATHED CABLE • SERVICE ENTRANCE CABLE • MAGNET WIRE • BARE WIRE



CRESCENT INSULATED WIRE and CABLE

By the way, the eel pictured here is also in the electrical business. It is the Electric Eel of South America, able to produce 300 volts generated in 240 cells of its body.

That's as good a comparison as we can draw when it comes to the easy fishing quality of Crescent Wire. In fact, it's the Crescent "Slick Finish" on the flame-retarding, moisture-resisting braid that relieves stress on insulation and conductors alike when pulling the wires through conduits. A smooth, hard, yet slick finish results which prevents adherence to other wires or the sides of the conduits.

Thus its ease of installation reduces labor costs and insures long life—which contribute to the unanimous opinion of all who sell and install it that CRESCENT INSULATED WIRE AND CABLE is a profitable line to handle.

CRESCENT INSULATED WIRE & CABLE CO. INC
TRENTON, NEW JERSEY

SOUTHERN REPRESENTATIVES

ATLANTA, GA.
Edgar E. Dawes
A-4 Rhodes Bldg. Annex

NEW ORLEANS, LA.
Paul Hogan, Jr.
305 Levert Bldg.

CRESCENT ENDURITE SUPER-AGING INSULATION • WEATHER-PROOF WIRE

Personal Service Pays This Dealer

COLD canvass does the job for some dealers, others put their eggs in an advertising basket, and still others will "swear" by store traffic and demonstrations, but P. O. Smith, Westinghouse dealer of Washington, D. C. "pays off" with service. As a matter of fact, his business was actually founded on the service troubles of other dealers.

Mr. Smith is a dealer of such energy, ambition, and enthusiasm that for recreation from an average of sixteen hours of work a day he finds relaxation and pleasure in the rather rigorous pastime of flying. And his wife, who sells a large share of the refrigerators, is also a partner in the flying business.

But to get back to business, Smith really entered the retail appliance business through the back door of service. His job was that of a service man. After several years of seeing only the "grief" of retailing, he decided he would be a dealer and sell refrigerators.

By consistently and constantly contacting his service customers, Mr. Smith, with the assistance of his wife, sold more than 200 refrigerators in 1937 . . . and he had a quota of 60 units. Add to this achievement the amazing feat of his acting as his own service man and you have a bird's-eye view of a real one-man organization!

Hard work? Of course, but Smith says that's the only answer to a "going" operation. It means being on the sales floor from nine o'clock in the morning until nine o'clock at night. And from eight o'clock in the morning until midnight he is "on call" for service, a sort of a "Doctor of Refrigeration" as it were!

When he goes out on a service call Mrs. Smith "doubles in brass," and when store traffic gets unusually heavy and demanding the two of them pitch in and sell. Mrs. Smith contributes a personal sales slant by making use of a remarkable faculty of recalling names and coupling them with facts concerning the prospect's, or customer's, close interest.

When customers come in to pay their bill it's, "Good morning Mrs. Jones. And how did Dickie recover from the measles last month?" Or, "Mr. Smith is out right now but I know he'd like to hear how your little girl is getting along in her dancing class, Mrs. Fultzic."

This one-man sales organization sold 200 refrigerators in a single year. He admits that it was accomplished principally by lots of hard work but attributes many of his sales to a personal service plan. . .

Mr. Smith does a minimum of advertising, sales promotion, and no canvassing. It isn't that he doesn't believe in these stimulating sales vehicles but he just doesn't have time to develop them. He feels he has built up his business on "service," personal service, and his customers have gotten so they demand him.

He confesses, ruefully, that he doesn't know what he will do if his business continues to expand. He explains there are really only so many hours in a day in which a man can work—but somehow the impression is left that when more sales and sales services are needed Smith will find a way to take care of them.

Prospects Found In Trailer Camps . .

Fifty extra sales of refrigerators! That is something worthwhile for any small city electric appliance merchant to be proud of; and that is just what the A. E. Drew & Company, hardware retailers of Goose Creek, Texas, has done.

This firm has picked up 50 extra sales of electric refrigerators by working the trailer homes in the vicinty. Goose Creek is in an oil and oil refining section. Many people live in trailers because houses are often hard to rent; and oil field workers like other such workers, know that they must move from job to job. But just because these people live in trailers is not sufficient reason for them to be denied the convenience and economy of an electric refrigerator.

The sales people of this hardware store get acquainted with the trailer owners who visit the store for fishing tackle, housewares needs and hardware articles. They show conclusively that one of the small electric refrigerators does not take up much space in the trailer home—really conserving space by contralizing food storage. And they show these prospects that proper refrigeration permits them to keep fresh meats, fresh vegetables and other good foods necessary for laboring people—and all at a cost much below canned foods that are commonly eaten in large quantity by people who live in camps.

These trailer sales have been very satisfactory—some for cash, and others on installments, for the records of the purchasers are carefully checked and only reliable people are accepted as credit risks.

Appliance Sales Trend Continues Upward .

(*Continued from page* 7)

taled 11,977, up 50 per cent over July and off 38 per cent from August, 1937.

Electric vacuum cleaner sales in August staged a comeback, reversing an industry downtrend and totaling 90,557, an increase of 32 per cent over July and 22 per cent below August, 1937.

With appropriate decreases lessening, the industry's sales for the eight months of 1938, as reported by C. G. Frantz, executive secretary of the Vacuum Cleaner Manufacturers' Association, total 838,395, or 30 per cent below the same period in 1937.

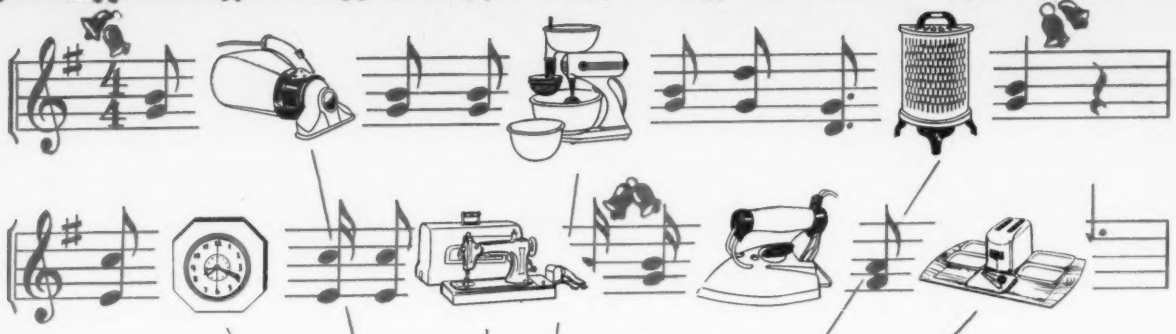
Catalog OF ELECTRICAL APPLIANCE

SUGGESTIONS

FOR THE HOLIDAY SEASON

Advertisers Represented In This Issue:

Armstrong Products Corporation
Burnham Boiler Corporation
Commonwealth & Southern Corp.
Electric Vacuum Cleaner Co.
Frederick Iron & Steel Company
Georgia Power Company
Hamilton-Beach Mfg. Co.
International Nickel Company
Graybar Electric Company
Premier Division
Tork Clock Company, Inc.
Edwin L. Wiegand Co., Inc.



HOW TO PLAY JINGLE BELLS ON YOUR CASH REGISTER THIS YEAR!

WE don't blame you for wanting to ring up a nice profit for the holiday season . . . But it takes sales to make profits. Will you be one of those dealers whose cash register keeps ringing merrily?

We believe you can be—and we believe we can help you. By providing a complete line of attractive, up-to-the-minute electrical appliances. By providing well-designed, well-made appliances that are particularly appropriate for Christmas gifts. By providing tested, sure-selling appliances made by the foremost manufacturers in the field . . . and backed by Graybar's 69 year reputation for quality.

Go to town with Graybar this year! Write us—or ask your Graybar salesman.

Graybar QUALITY SINCE 1869 — Distributed and guaranteed by Graybar ELECTRIC COMPANY

OFFICES IN 83 PRINCIPAL CITIES — EXECUTIVE OFFICES: GRAYBAR BUILDING, NEW YORK, N. Y.

OPPORTUNITY KNOCKS

MR. DEALER...Here is a line of cleaners for every purse and purpose ...PROFIT WITH **PREMIER**

PREMIER DUPLEX
MODEL PR-20

PREMIER
MODEL PR-30

PREMIER VAC-KIT
MODEL PR-70

PREMIER PIC-UP
MODEL PR-50
WITH MOTOR-DRIVEN BRUSH

PREMIER SPIC-SPAN
MODEL 148

Premier Sweeps the Country as the Ideal Christmas Gift

Four famous Premier floor models to choose from with prices to fit every customer's purse. The amazing new Premier Vac-Kit that is selling like hot cakes and practically revolutionizing household cleaning. Two of the most popular hand vacuum cleaners on the market . . . All models popularly low priced to sell in volume yet carrying a real profit for the dealer . . . That's what Premier offers you for the Christmas season . . . If you haven't got the details *don't delay*, write now and get in on the real Christmas Payoff . . . Remember Premier is advertised to three out of four of your customers in Life—Good Housekeeping—Woman's Home Companion and McCalls.

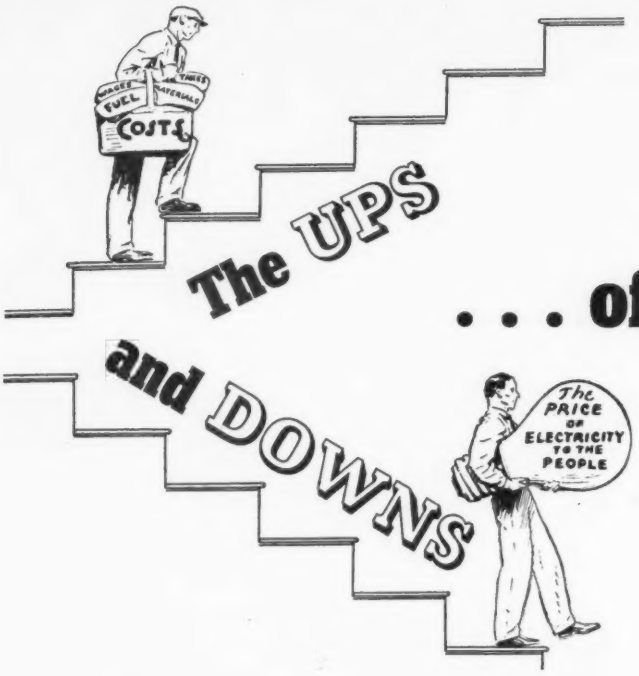
PREMIER DIVISION ES-11-38
Electric Vacuum Cleaner Co., Inc.
1734 Ivanhoe Road • Cleveland, O.

Rush complete information on Premier Vac-Kit to

*Name*_____

*Street*_____

*City*_____ *State*_____



The UPS and DOWNS . . . of Electric Service

"PUBLIC UTILITIES are having their ups and downs" you hear.

But in the "ups and downs" of costs and prices, the benefits are all in favor of the one interested party uppermost in the minds of private utility management: the consuming public.

The "UPS" is the cost of operation, wages, materials, taxes, and barriers induced by legislation. Despite this, the ultimate point of public concern, the price of electricity to the people, stands as a resounding "DOWN" that belies the shower of misinformation about the industry.

This "DOWN", today the lowest in history, is contributed to the people as an economy of public-minded, experienced and reliable private management. In this day of soaring taxes and high living expenses, what else gives you so many "extra values" for the same or less money?

The Commonwealth & Southern Corporation

MICHIGAN • ILLINOIS • INDIANA • OHIO • PENNSYLVANIA • TENNESSEE • ALABAMA
FLORIDA • GEORGIA • MISSISSIPPI • SO. CAROLINA

MRS. AMERICAN HOUSEWIFE SPEAKING:

(MORE THAN ONE HUNDRED THOUSAND OF HER)

"YES—I'D SAY CHROMALOX UNITS IN ANY RANGE YOU BUY"

"I have them on my range and they certainly are fast-cooking, and that saves both time and money. Besides they have two rings, one inside the other—I think they call it "two-units-in-one"—and so when you cook with a small pan you use only the small inside ring. You can see how that saves electricity . . . yes, they're the only units made that way. They're all flat on top, too, and if you spill anything on them it doesn't matter—you just wipe it off. Most good ranges seem to have Chromalox units, so you won't have any trouble getting them."

Through Chromalox Super-Speed Units, more than one hundred thousand American housewives have discovered the speed and economy and cleanliness of electric cooking. These women are spreading the word. Sell Chromalox-equipped ranges. **Be ready for the buyer who says, "I want a range with Chromalox units".**

Why **CHROMALOX UNITS** *sell ranges*

METAL TO METAL CONTACT
with bottom of cooking vessel means heating by conduction — the fastest way of transmitting heat.

"TWO-UNITS-IN-ONE"
permits selection of heating area to fit the size of the utensil, eliminating wasted heat.

THE PERFECTLY FLAT TOP
results in easy cleaning as well as economical cooking.

FOOLPROOF CONSTRUCTION
makes these units immune to the usual harmful effects of spill-overs and heavy handling.

SUPERIOR TERMINAL DESIGN
all connections "Mone!" metal—non-corrosive and heat-resisting.

EXTRA LONG SERVICE LIFE
practically eliminates trouble-calls and profitless servicing.

GET THE FACTS
about Chromalox units that have helped to sell thousands of ranges.

Write us or see nearest representative

ATLANTA, Ga.—C. B. Rogers, 1000 Peachtree St. OKLAHOMA CITY, Okla.—Paul Berry, 225 Key Building
DALLAS, Texas—Elgin B. Robertson, 1215 N. Zangs Blvd. RALEIGH, N. C.—W. R. Phillips

EDWIN L. WIEGAND CO., 7600 Thomas Blvd., Pittsburgh, Penn.

MILESTONES

Of Georgia's Progress

The average price of electric service in the homes of Georgia served by the Georgia Power Company for the first time in

November, 1929, Dropped Below 6 Cents per KWH

(The depression had just begun, but prices in general were still high. The price of electricity, however, was low for those times. It had been declining almost continuously since 1913.)

The average price of electric service in Georgia's homes for the first time in

January, 1934, Dropped Below 5 Cents per KWH

(A reduction in rates was made in April, 1933. Another reduction became effective January 1, 1934.)

The average price of electric service for the first time in

June, 1934, Dropped Below 4 Cents per KWH

(Still the result of the last rate reduction, together with the increased use of electricity for greater comfort and more leisure in Georgia homes.)

The average price of electric service for the first time in

November, 1937, Dropped Below 3 Cents per KWH

(Another rate reduction went into effect January 1, 1937.)

Rates are still on the downward path. The average price for

The Year 1938 Will Be 2.9 Cents per KWH

Continuously lower. When the average price dropped below 6 cents, 5 cents, 4 cents and 3 cents it never went back.

Electric rates among the lowest in the nation are a priceless asset of Georgia.

GEORGIA POWER COMPANY

Armstrong
PORTA-LECTRIC IRONER

A Brand New CHRISTMAS ITEM!

With Pre - Holiday Advertising in LIFE to Help You Sell It!

A lively selling specialty any time and particularly fast for holiday sales . . . boosted by November and December advertising to LIFE'S wide-awake millions. Complete merchandising helps are available to speed your holiday sales.

Retails Only $26.95

Outstanding Porta-Lectric features: Weighs only 26 pounds, easily portable, used anywhere. Irons everything perfectly. Motor enclosed in roll, convenient elbow control. Demonstration sells it! Write for full details and discounts.

Write for Information and be ready for GIFT Buyers

ARMSTRONG PRODUCTS CORPORATION
Dept. ES-118, Huntington, W. Va.

EXTRA SALES FEATURES—the extra features of the Hamilton Beach food mixer give you extra selling points—easier sales.

NATIONALLY ADVERTISED in the Rotogravure Section of Sunday newspapers.

FREE DEALER HELPS—Complete — attractive. Furnished *free on request.*

Order Hamilton Beach food mixers from your Wholesaler. Write us for *free* dealer helps.

HAMILTON BEACH CO., Racine, Wis.
Division of Scovill Manufacturing Co.

HAMILTON BEACH FOOD MIXER

TORK CLOCKS
for
Window Lighting, Signs, Heating, Ventilating and Air Conditioning.
Portable Models for Radios and Cookers
$9.75 and up
WRITE FOR BULLETINS

W. H. Berry, Jr.
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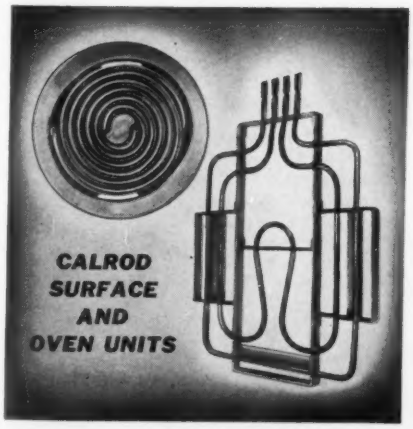
The Tork Clock Co., Inc., Mount Vernon, New York

"IMPERIAL" commands ROYAL RESPECT

General Electric's Imperial "60" . . . available with Monel top only

. . . and also PUBLIC ACCLAIM



Calrod surface and oven units give high efficiency, speed, and economical operation. The heating element is encased in Inconel—a Nickel-chromium alloy developed especially for use at high temperatures. Inconel gives quicker and more economical heat transfer, long life, and will not scale, rust or corrode at high temperatures.*

Superior in performance and appearance, this new Monel-topped G. E. ranks tops among fine ranges

PRESENT the modern housewife at the court of the G. E. "Imperial"... and what a thrill for her! When she fulfills a lifelong ambition by *ordering* this regal range, what a break for *you!*

Fast, smooth operation and smart "dashboard" control put the G. E. "Imperial" in the "fine car" class. And the silvery Monel* top puts this superb range in the fine kitchen class.

Yet the beautiful silvery sheen of the Monel top is not its only important quality. Monel's ability to take hard knocks... to withstand the abuse of a busy kitchen ...is also a mighty big factor. For Monel with its silver-like beauty, is as tough and strong as steel. It does not rust. And neither spilled foods and liquids, nor the juices of fruits and vegetables, for long mar its satin lustre. Easily and quickly restored with the ordinary kitchen cleanser, the appearance of Monel actually improves with the years.

Take advantage of the demand for nationally advertised modern Monel kitchen equipment. Display the range that's a feature attraction in this month's Monel "American Home" ad. Write for further information on electric ranges with Monel tops. Address: *Reg. U. S. Pat. Off.

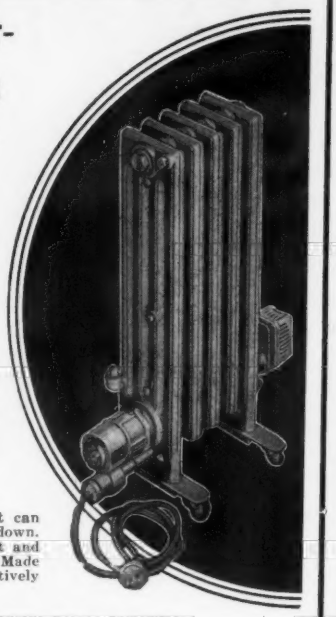
THE INTERNATIONAL NICKEL COMPANY, INC.
67 WALL STREET NEW YORK, N. Y.

MONEL

*"Monel" and other trade-mark which have an asterisk associated with them are trade-marks of The International Nickel Company, Inc.

Handy-Heat-On-Wheels

An Electrical Steam Radiator



In addition to the radiant heat of electric bowl-type heaters, it also gives you convected heat. That means quicker heating, and an economy of current. In fact, the small size one uses no more current than an electric iron. It is just the thing for bathrooms or any hard-to-heat room. Also ideal in any room for cool damp days of Spring, Summer and Fall when main heating is not in operation.

Easily wheeled from one room to another. So light it can be carried upstairs or down. Equipped with both thermostat and automatic current cut-off. Made in 4 sizes. Finished attractively in black and neutral color.

MANUFACTURED BY BURNHAM

Burnham Boiler Corporation

Irvington N. Y.

Manufacturers of Heating Equipment Since 1873

Representatives in All Principal Cities of the United States and Canada

"Dealers want fast-moving, profitable Stoker line!"

DEALERS WANTED for FREDERICK STOKERS

Let's get together! We've a completely modernized line of Anthracite and Bituminous Stokers. Compact, neat, priced right and fast selling. *Your inquiry brings you Liberal Dealer's Proposition, without obligation. Write—*

The FREDERICK IRON & STEEL CO.

P. R. R. & Eighth Street

FREDERICK, MARYLAND

"Builders of Good Stokers for 20 Years"

DEALERS--

Everywhere

Christmas centers around the home. Between now and Christmas Eve, you should suggest to each and every customer that no gift adds more to home comfort and pleasure than an

Electrical Gift

Use the power of suggestion... It works!

Contracting

IN THIS SECTION:
Memphis "Lights Up" Electrically for Xmas Campaign Produces Better Wiring
Designing Branch Circuits for Motor Loads

Local Wiring Programs Continue Activities

DURING the eight months since the National Adequate Wiring Program was launched, approximately 150 active local wiring promotions throughout the country have been initiated. Seventeen cities have been licensed to operate the certification plan and national headquarters has been in correspondence with more than 400 cities and towns located in 46 states.

The following brief news items serve to high-light some of the recent activities of important local programs in the South.

* * *

A special panel board developed by the Dallas Adequate Wiring Committee to show the advantages of adequate wiring and the false economy of skimpy wiring was demonstrated at the National Home Show on September 5-11 in the Automobile Building at Fair Park, Dallas. Individual circuits of No. 14, 12 and 10 wire were connected with a meter calibrated to show wattage losses. Each circuit was 125 feet in length and a total connected load of 1920 watts was used. On the No. 14 wire, the meter showed a loss of 80 watts; on No. 12, a loss of 52 and on No. 10, a loss of only 35 watts.

Demonstrations will continue to be given in the Home Service cottage in the Dallas Power and Light Building.

* * *

W. H. McInnis, chairman, Activities Committee, Memphis Electrical League, reports that since June, five new homes have been certified and that there are now sixty-four applications pending for the adequate wiring certificates.

* * *

A comprehensive program of adequate wiring promotion is now being organized in Florida and it is expected that this activity will start with an operating plan of the Florida Power and Light Company and be extended to a co-operative undertaking of the entire electrical industry in the state. A. C. Bergh, lighting specialist of the utility, has been instrumental in preparing the basis for the proposed wiring program.

* * *

A well-planned program of education on behalf of adequate wiring is being organized by Mississippi Power and Light Company, at Jackson, to be operated throughout its territory. The company has issued an attractive manual entitled, "Adequate Wiring Hints," which is being distributed personally to all architects, contractors, dealers and others at group meetings.

* * *

The Electrical League of Richmond has been licensed by the national bureau to operate the certification plan in the City of Richmond and eleven counties in Virginia. Boyd A. Propert is chairman of the Business Development Committee of the League.

Houston, Texas, Adopts New Electrical Ordinance . . .

A new electrical ordinance was adopted by the Houston, Texas, City Council in September after the final reading required by law. It is expected that some amendments may be offered later.

The ordinance has been in the process of preparation for the past 10 months. It proposes to regulate electrical work in Houston and provide for the safe installation of electrical work.

It provides for an electrical board of eight members representing several branches of the electrical industry. The board would have charge of examining and licensing all persons engaged in the installation, maintenance, repair and alteration of electrical wiring, fixtures and equipment.

The ordinance calls for four classifications of licenses, including master electrician, maintenance-man electrician, journeyman and apprentice. No electrical work could be done in Houston except under the direction of a master electrician.

Mass Attack By Industry Required in A-W Program

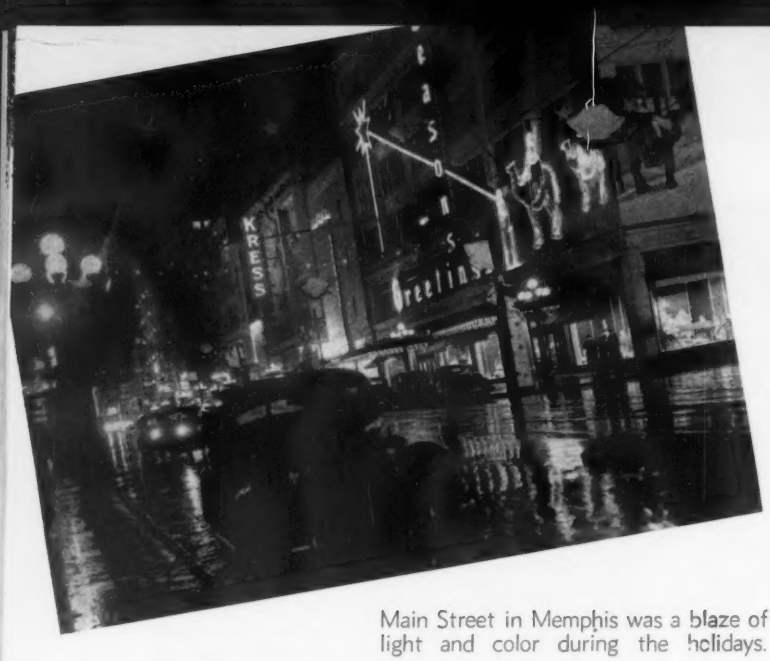
SALESMANSHIP and service will replace price competition when industry's mass attack shows home owners the value of wiring, says Laurence W. Davis, general manager, N.E.C.A., and member of the National Adequate Wiring Bureau's Plan Committee. Emphasizing the electrical contractor's viewpoint in the National Adequate Wiring Program, Mr. Davis says:

"For many years house wiring has been an unsatisfactory, price-competitive field for electrical contractors. Many qualified electrical contractors abandoned attempts to engage in house wiring because the householder had learned to measure the value of his wiring only by the price.

"The National Adequate Wiring Program is a mass attack by the industry upon this fundamental weakness. When the home owner can be shown that the value of the electrical service in his home depends upon the character of the wiring that lies unseen within his walls and upon the number and convenience of its points of utilization, price competition in this field can be replaced by salesmanship and service.

"The National Adequate Wiring Program is welcomed by electrical

(*Continued on page* 32)



Main Street in Memphis was a blaze of light and color during the holidays.

Memphis "Lights Up" for Christmas

By J. I. Gordon

COOPERATION proved to be more than just a word when all electrical interests combined last year in Memphis to make Memphians "electrical conscious" during the Christmas season.

Main Street became a valley of flame and color for many blocks in the downtown district, and Memphis became a mecca for Christmas shoppers. Electrical contractors experienced one of their busiest months of the year handling the hundreds of lighting installation jobs in hotels, stores and homes. Appliance dealers, as well as general merchants, marked the season as one of the best in Memphis for many years.

Through the cooperation of the Memphis Electric League, the Memphis Power and Light Company and the Memphis merchants, indoor and outdoor lighting decorations took on a new meaning. A definite plan was mapped out for Christmas lighting and it went over with such tremendous success that officials in charge stated it would be an annual event.

Materials Contributed

The Memphis Power and Light Company donated labor, lights and current toward the Main Street lighting. About 1,500 feet of streamers for arches, covering ten city blocks in the heart of the shopping district, were loaned by the Memphis Electric League. There were approximately 800 lights of red, green and amber used on the streamers. The Memphis merchants decorated their stores with many colored lights forming various designs. Extra lighting in shop windows added more brilliance to the displays, and indoor lighting of the stores called for a larger number of lights and wiring materials.

Scarlet ruscus branches and banners with bells and other Christmas emblems formed an arch for the parade. White reindeers reared from tall pedestals spotted with red and blue stars. Christmas trees fashioned from real evergreen formed a miniature loop forest. Tall columns, topped with silvered angels, were wired for sound and broadcast Christmas carols during the parade, and every evening throughout the month.

Parade Ushers In Season

Santa Claus made his first appearance in a parade of scintillating splendor. The theme of the parade was "The Night Before Christmas," and 23 shimmering, electric light studded floats gleamed and glowed, with one platform mounting lights totaling a million candlepower. The floats made a rainbow path with colored lights by the hundreds sprinkled around the fairy story and nursery rhyme characters. They were designed and made by high school art students and other volunteers, under the direction of Memphis art teacher, Mike Abt.

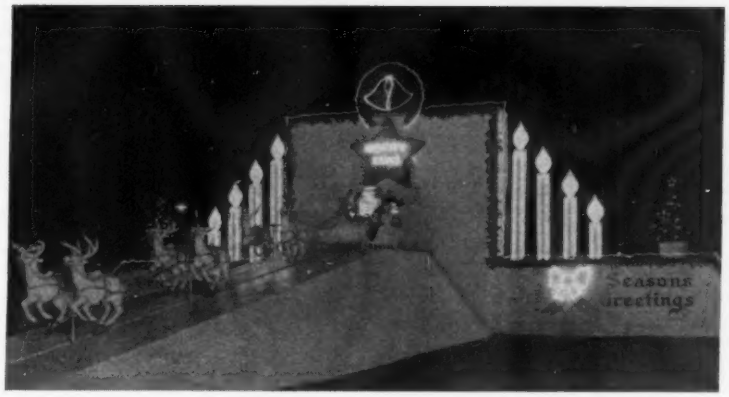
Over 200,000 persons, the largest group ever to gather in Memphis, viewed this burst of electrical brilliance. The sponsors were highly successful in imbuing the city with the Christmas spirit a month in advance. The local newspapers lent their support by giving a great deal of publicity to the parade and Christmas lighting, which created more interest in the project.

Santa Claus Brings Shoppers

The largest Santa Claus on earth made by the art students, sat on a high seat in Court Square and through sound effects talked with the children at certain intervals during the day. A local radio station had charge of the broadcast, and the Memphis Power and Light Company furnished and installed flood-lights in cooperation with the Memphis Electric League.

Every hotel in the city cooperated with the plan, and bedecked the lobbys, ballrooms and dining rooms with lighted Christmas trees. One hotel placed a 23 foot cedar in the main lobby, used 624 various colored lights, while another hotel carried out an unusual decorative plan in the ballroom. A false ceiling made of tinfoil cut to resemble leaves was strung over 100-watt blue mazda lights. The same type lamps were used around the side walls. Over 100 lights created the silver and blue effect. Small Christmas trees strung with 10-watt blue lights were placed about in corners and alcoves.

Erection of an electric sign depicting jovial St. Nick and his reindeer-drawn sleigh was placed in Confederate park. The display was one of the most impressive



What was claimed to be the largest Santa Claus ever made was erected in Court Square. Wired for sound, he talked with the children at intervals throughout the day and brought early shoppers downtown.

in the down-town district. The display was 60 feet long, and about 18 feet high. It was erected by Everett Pidgeon of the Coca-Cola Bottling Company of Memphis, and the Coca-Cola Bottling Company of Covington, Tenn. It had moving effects and showed the reindeers moving along as they pulled Santa Claus' sleigh.

The ninth annual Outdoor Christmas Lighting contest, sponsored by the City Beautiful Commission and the Memphis Electric League, gained more new entries this year than ever before. A revised system of classifying and judging the displays is believed responsible for the increased interest the public manifested this year.

Lighting Contest Effective

Prizes were awarded on the percentage basis, giving the owner of a modest display the same opportunity to compete for prizes as the entrant of a lavish display of lights. Cash prizes totaling $115 were awarded. The Memphis Electric League awarded 52 engraved certificates to the persons entering the most attractive exhibit in each of the 52 wards. A silver cup was given the ward chairman of the City Beautiful Commission who obtained the largest number of new entries. All entries, whether they were trees, scenic effects or house illumination, were entered with the commission. Commercial firms were eligible to compete for prizes, and a great many entered the contest.

The City Beautiful Commission also conducted a two-day class in Christmas decorations, which created a great interest in home lighting.

The system of judging was as follows: Two cash prizes were given for the best entries using up to 50 lights. Three prizes were offered in the second group numbering from 50 to 100 lights and the third group was confined to entries with from 100 to 200 lights. For those with 200 or more lights there was one cash prize.

The idea spread to every town within a radius of 100 miles of Memphis, and electrical contractors and dealers of adjoining towns reaped an added harvest in selling lamps, electrical appliances and wiring materials.

Decorations Sell Homes

The novel scheme of combining a project of holiday lighting and decoration with new home showings proved a successful method of offsetting the public's usual apathy toward house-looking during Christmas week. One real estate dealer in the city used a three-bedroom bungalow as the subject of an extensive decoration plan. A Santa Claus in a sleigh, pulled by reindeers with bells, was mounted on the roof tree and strung with lights. The outline of the front elevation was decorated with blue bulbs. A Christmas tree was put in the front room and illuminated with blue bulbs. Several huge spotlights lighted up the property and the firm's advertising sign, in particular, which was shaped like a Christmas tree. Mammoth candles were put at the entrance, and the salesman dressed as Santa Claus.

The house was entered in the Christmas lighting contest, and was opened for inspection several days before Christmas. Several hundred visitors viewed it each evening, and the demonstration continued through the week. Of course, it was sold quickly.

The holiday season was ushered in with an electric parade of scintillating splendor. Twenty-three light-studded floats, one mounting a million candlepower, were entered. More than 200,000 people gathered to see them.

Practical Voltage Drop Chart . .

ELECTRICAL contractors will find many uses for the voltage chart designed recently by J. Walter Collins, of the Electrical Contractors Association of Chicago, and reproduced here.

Mr. Collin's purpose in designing the chart was to supply the need for a simple table that could be understood by the layman with only a minimum of explanation. Many contractors have found it particularly useful in their efforts to sell adequate wiring, either in new installations or remodeling work.

The vertical columns are headed by "per cent voltage drop." Directly underneath each voltage drop percentage are given the corresponding calculations for loss in light as a result of operating lamps at less than rated voltage, and loss in energy as heat in conductors. In the lower part of the chart are given the length of circuit for given size wire and ampere loads which will not exceed the per cent voltage drop given at the head of the vertical column. The distance, of course, is the lineal distance, one way, from source to load.

As an example of the use of the chart, assume that a 15-ampere circuit is to be installed, the length of which is 55 feet. Assume further that the voltage drop is to be kept within 2 per cent. Following down the vertical column headed by "2 per cent" until opposite the number 15 in the "amperes" column, it will be noted that a 25-foot circuit is permissable with No. 14 wire; 40-feet, with No. 12; and 64-feet, with No. 10. For a 55-foot circuit it would therefore be necessary to use No. 10 wire since No. 12 or No. 14 would result in voltage drops of more than 2 per cent.

Amperes	Wire Size	VOLTAGE DROP 1	2	3	4	5	6	7	8	9	10	15	20
		% LIGHT LOSS 3	7	10	13	16	19	22	25	28	31	46	61
		% LOSS IN COST OF CURRENT 1.5	3.0	5.5	6.0	7.5	9.0	10.5	12.0	13.5	15.0	22.5	30.0
		CIRCUIT LENGTHS BY VOLTAGE DROP One Way — 115 Volt — 2 Wire											
10	14	19	38	57	76	95	114	133	152	171	190	285	380
10	12	30	60	90	120	151	180	211	241	271	302	453	604
10	10	48	96	144	192	240	288	336	384	432	480	720	960
15	14	13	25	38	51	63	76	88	101	114	126	190	253
15	12	20	40	60	80	100	120	140	160	180	200	300	400
15	10	32	64	96	128	160	192	224	256	288	320	480	640
20	12	15	30	45	60	76	91	106	121	136	151	228	303
20	10	24	48	72	96	120	144	168	192	216	240	360	480
20	8	38	76	115	153	191	229	267	306	344	382	573	764
25	10	19	38	57	76	96	115	134	153	172	192	288	384
25	8	31	62	94	126	157	189	220	252	283	315	472	630
		For 3 Wire Circuits Double Circuit Length											
		CIRCUIT LENGTHS BY VOLTAGE DROP One Way — 230 Volt — 3 Wire											
25	8	63	126	189	252	315	378	441	504	567	630	945	1260
30	8	50	102	152	204	254	306	356	408	458	510	764	1020
35	8	44	87	131	175	219	262	306	350	393	437	656	874
35	6	70	139	208	278	347	416	486	555	625	694	1041	1388
40	6	60	121	182	243	304	365	426	486	547	608	812	1216
50	6	48	97	146	194	243	292	340	389	437	486	729	972
50	4	78	155	232	309	387	464	541	619	696	773	1160	1546
60	4	64	129	193	258	322	386	451	515	580	644	966	1288
70	4	56	110	166	221	276	331	386	442	497	552	883	1104
70	3	70	139	209	278	348	418	487	557	626	696	1044	1392
75	3	65	130	195	260	325	390	455	520	585	650	975	1300
80	3	60	122	183	244	305	365	426	487	548	609	914	1218
80	2	77	154	230	307	384	461	538	614	691	768	1152	1536
85	2	72	145	217	289	362	434	506	578	651	723	1085	1446
90	2	68	137	205	273	342	410	478	546	615	683	1025	1366
90	1	86	172	258	344	430	517	603	689	775	861	1291	1722
100	1	78	155	233	310	388	465	543	620	698	775	1163	1550
100	0	98	195	293	391	489	586	684	782	879	977	1466	1954
125	0	78	156	234	312	391	469	547	625	703	781	1172	1562
125	00	99	197	296	394	493	592	690	789	887	986	1479	1972
150	00	82	164	247	329	411	493	575	658	740	822	1233	4644
150	000	104	207	311	414	518	622	725	829	932	1036	1554	2072
175	000	88	177	266	355	444	532	621	710	798	887	1331	1774
175	0000	112	224	336	448	560	672	784	896	1008	1120	1680	2240
200	0000	98	196	294	392	490	588	686	784	882	980	1470	1960
225	0000	87	174	261	348	436	522	610	697	784	871	1309	1742
200	250M	111	222	333	444	555	666	777	888	999	1111	1666	2222
250	250	93	185	278	370	463	556	648	741	833	926	1389	1852
250	300	111	222	333	444	555	666	777	888	999	1111	1666	2222
275	300	101	202	303	404	505	606	707	808	909	1010	1515	2020
275	350	118	235	353	471	589	707	825	942	1060	1178	1767	2356
300	350	108	216	324	432	540	648	756	864	972	1080	1620	2160
300	400	124	247	371	494	618	741	865	988	1112	1235	1853	2471
325	400	114	228	342	456	570	684	798	912	1026	1140	1710	2280
325	500	143	285	428	570	713	855	998	1140	1283	1425	2138	2851
400	500	119	238	357	476	595	714	833	952	1071	1190	1785	2380

Compiled by J. W. Collins

Campaign Produces Better Wiring In New Orleans .

LUNCHEONS, dinners and meetings which usually include a lot of talking and little action were discarded by the Electrical Association of New Orleans in an adequate wiring campaign just concluded.

The usual methods of inducing contractors and home builders to consider more seriously the question of ample and modern wiring installation were tossed into the waste basket for a more direct and impressive method that, association leaders say, proved successful to a marked degree.

The association chose a folder which illustrated not only reasons for more adequate wiring, but most direct and modern methods for such installation. These folders were presented to contractors at a meeting in June and the results have been highly gratifying during the summer months.

Residence construction in New Orleans took a spurt during the summer reaching a 10-year record in August. New homes constructed during the summer have shown an increase of from four to twelve more outlets over those homes constructed several years ago, according to leaders of the New Orleans Association. Wiring sufficient to carry reasonable loads was installed and other steps taken to assure adequate and efficient connections.

The folder given contractors announced the following aims for the campaign:

"To insure through the operation of a broad-gauge and continuing program that thousands of homes in New Orleans will be built with adequate wiring installations which shall bear a practical relation to the size and character of such homes.

"To assist in every possible way in spreading the idea of adequate wiring to the end that the conditions in both new and old homes will be greatly improved through making knowledge of advances in the art of wiring generally available to the public.

"To establish in consequence of this activity a broader utilization of electricity in the home, thereby

"Achieving a much-needed service to the public in terms of better

(*Continued on page* 32)

Effect of Motor Starting Currents on Branch Circuit Wiring Design

By J. M. Flanigen

Asst. Supt. Retail Operations
Georgia Power Company

IN an address before the recent meeting of the Southern Section, I. A. E. I., in Jacksonville, Mr. Flanigen pointed out some of the problems encountered in designing branch circuit wiring for motors. Much of his address will be of particular interest to electrical contractors. . . . .

THE increasing use of motor driven appliances in the home, and in the office, has created wiring conditions that are entirely different from those encountered a few years ago. It is not uncommon now to find a motor-driven appliance put to every day use in the home, requiring a motor of ¼, ½ or even 1 hp. Therefore, the use of motors on branch circuits is something that should be considered in laying out the wiring in the home.

One may safely assume that a motor furnished by the manufacturer for a particular machine will do the work required, provided we get the power to it. However, the manufacturer has no control over where the machine will be used, or of the wiring conditions on the premises of the customer. He does not know whether the machine will be used in the center of a large metropolitan area, or out on some long rural line.

In order to give satisfactory service, it is sometimes necessary for the manufacturer of the machine to change the motor to provide proper characteristics, i.e., a machine which might operate satisfactorily in a factory with a certain type motor may be entirely unsatisfactory in the home.

One of the first variables to be encountered is the system capacity available at the point of supply. This depends entirely upon the facilities of the utility supplying the power, or upon the generating capacity of the power plant.

It may be unfortunate, but is nevertheless true, that an a-c motor requires from five to seven times normal full load current to start it. This inrush lasts for a few seconds only, but it is of sufficient duration to create an objectionable disturbance to lights, protective equipment, and in some cases to equipment of adjacent customers. It is obviously impracticable to install sufficient service and distribution equipment to meet this instantaneous demand, otherwise the Code would deal with starting currents rather than running currents. Therefore, it is necessary to provide some form of device to limit the current inrush; this may be external to the motor, or it may be built into it.

As a general outline of the various types of motors, we might summarize the usual ones encountered. These are divided generally, of course, into two classes, single-phase and polyphase. Sometimes it is a question of finding which service is available; in other cases, it is necessary to provide three-phase service to secure satisfactory operation. As a general rule, a single-phase motor larger than 5 hp is not satisfactory, and if three-phase service is available motors larger than 3 hp should be three-phase.

In designing a wiring system for any particular installation, there are many variations that must be given consideration. Motor wiring cannot be designed successfully by any rule of thumb method. The following brief descriptions of the various types of motors and controllers in common use will serve to give some idea of the many factors involved. It is not the purpose of this discussion, of course, to point out which is the best type of motor or controller for any particular application.

Single Phase. The single phase induction motor does not have any starting power. Therefore, some means must be provided to produce torque in starting. After

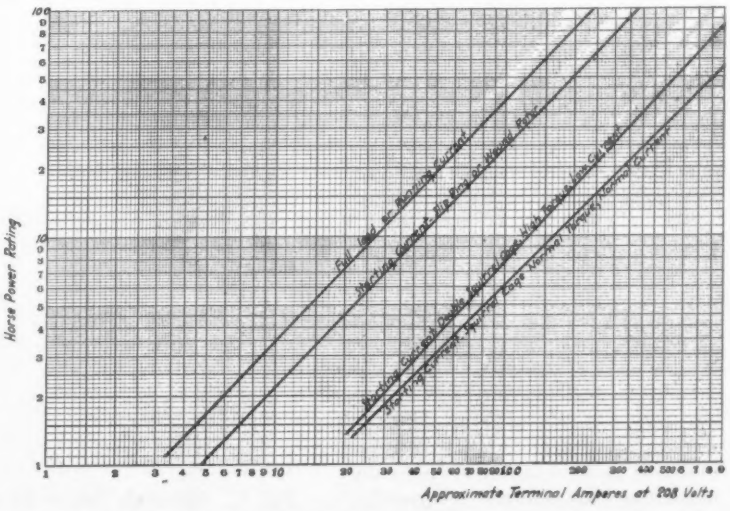


Fig. 1. This chart shows the starting current required for various sizes and type of motors in comparison with full load current. . . . .

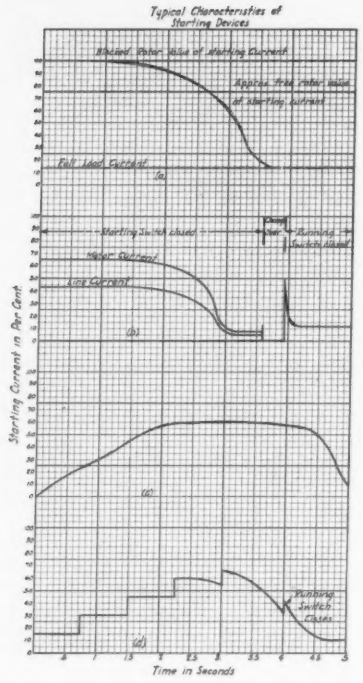


Fig. 2. Typical characteristics of various types of starting devices are shown in these curves. (a) Across the line start. (b) Autotransformer starter with 65% tap. (c) Compression type resistance starter. (d) Step-type resistor or auto-reactor type starter. . .

the motor comes up to speed, it will operate satisfactory. Various methods have been provided to produce this starting torque.

(*a*) *Split Phase.* This type of motor is built as a two-phase motor. The two-phase effect is derived from a combination of resistance and reactance in the circuit, giving a lagging current in one winding. When the motor comes up to speed a centrifugal switch cuts out this starting winding and the motor operates as a single-phase motor. While this motor is one of the simplest and easiest to make, it has a very low efficiency and a very low power factor and, therefore, is not desirable for continuous or frequent operation.

(*b*) *Capacity Type.* This type of motor is similar to the split phase except the phase shifting is done by a capacitor instead of a reactance. It has much better operating characteristics. There are many variations to this type and it is being used extensively on machines that operate frequently, such as fans, oil burners, refrigerators, etc.

(*c*) *Repulsion-Start, Induction-Run Type.* The repulsion motor is based upon the fact that a closed copper ring placed in an alternating magnetic field will be pushed out of the field, or turned so that its plane is parallel to the lines of force. The usual type of this motor has the armature winding brought out to a commutator similar to a d-c machine. The brushes are usually short circuited so as to provide a closed copper loop cutting across the lines of force. This provides a definite high torque, which starts the motor and brings it up to speed. When it approaches synchronous speed a centrifugal device short circuits the commutator and lifts the brushes, leaving a straight induction motor. This motor has very desirable characteristics of high torque and low current, and is used on loads requiring the machine to start under load.

(*d*) *Repulsion-Induction Type.* This type of motor is similar to the above except it has two windings on the rotor, one of which, because of the relations of resistance, comes into use at start and provides a repulsion effect. When the motor comes up to speed, the frequency of the rotor circuit changes and the current begins to flow in the second winding, and this carries the load as an induction motor. This type of motor has characteristics similar to the repulsion - start induction - run motor and is used for loads requiring fairly high starting torque. Since its change from repulsion to induction is an electrical one it is very smooth in operation, and there is no wear and tear of moving parts. It may be reversed easily, and therefore, may be used on machines requiring this feature.

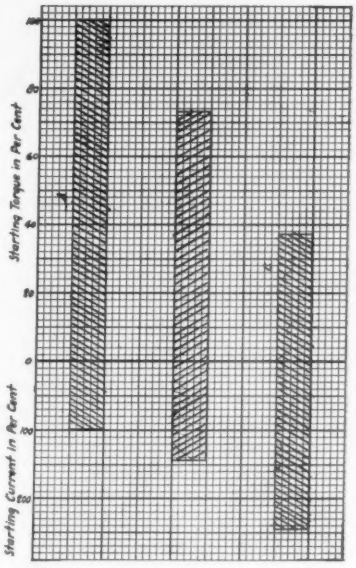


Fig. 3. The starting torque and current of three different types of single phase, 110 volt 60 cycle, ¼ hp motors are shown here to emphasize the large variation in characteristics that may be found in motors of different types. . . . . .

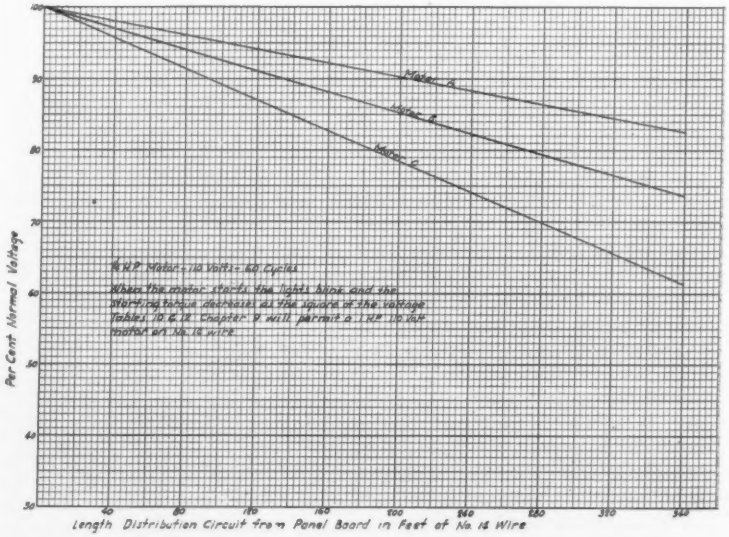


Fig. 4. Although Tables 10 and 12 of the National Electrical Code permit a motor as large as 1 hp on No. 14 wire, the contractor making such an installation must give attention to the large starting current that may be required. Effect on voltage is shown here. . . . .

Three Phase. The three-phase motor is inherently self-starting, therefore, no device is necessary to provide starting conditions.

(*a*) *Standard Squirrel Cage.* This is the usual type of induction motor with normal starting current and starting torque. Starting current will be from six to seven time normal full-load current. The starting power factor is usually around 40%. This motor is a general purpose motor, and provides around 150% running torque at start, which is sufficient to start the usual load. However, the high current drawn is sometimes objectionable.

(*b*) *Low Starting Current, Normal Starting Torque.* This type of motor has the rotor winding changed, usually by inserting resistance to provide normal torque at a lower current. It is not quite as efficient as the standard squirrel cage, but has the ability to pick up load with a smaller current.

(*c*) *Low Starting Current, High Starting Torque.* These motors are commonly called double squirrel cage or double deck, as they have two rotor windings; one high resistance and low reactance, the other high reactance and low resistance. At the instant of start the frequency of the rotor current is high, and therefore, the current flows in the low reactance winding, and thus because of the high resistance provides high torque. As the rotor comes up to speed, the frequency of the rotor current decreases (at synchronous speed it would be zero). Therefore, the current begins to flow in the high impedance winding, which having a low resistance carries the load with good efficiency. The starting current is on the order of three to five times normal. It is used extensively on air conditioning equipment where high torque is necessary at start.

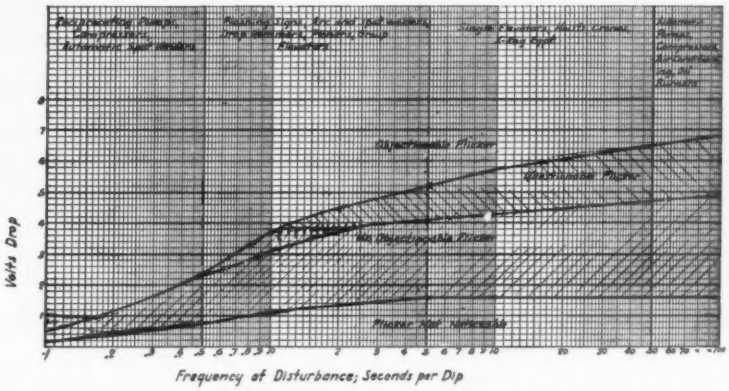


Fig. 5. "Flicker effect" resulting from voltage drops depends on rate of change of drop, frequency of flicker, and total voltage drop. This chart shows the effect of different types of equipment on lighting.

(*d*) *Slip Ring or Wound Rotor.* This type of motor has an external resistance in the rotor circuit, giving high torque and low starting current. This resistance is cut out as the motor comes up to speed. When it approaches synchronous speed the resistance is short circuited, giving a squirrel cage rotor. It is ideally adapted to locations where high torque and low current are desired.

(*e*) *Synchronous.* The synchronous motor is especially adapted to continuous loads where high efficiency and high power factor are desired. It is not self starting and various schemes are used to provide starting torque, one of the most popular being a squirrel cage winding imbedded in the rotor.

From the above it will be seen that as a general rule high starting torque is obtained by putting resistance in the rotor circuit. Since an induction motor at stand still is equivalent to a transformer with short circuited secondary, this also decreases the starting current. However, since the rotor losses are equal to the slip, the higher resistance rotor causes greater slip, and of course, greater losses, which results in lower efficiency. Therefore, an external device is used to provide starting torque, without such a loss in efficiency.

In Figure 1, we have shown the relation of running current to starting current for the various type motors.

The usual device simply provides a lower voltage for the motor. However, it must be remembered that the torque varies as the square of the applied voltage, i. e., if 70% voltage is applied the starting torque is reduced in the order of 50%. This is not objectionable if the motor starts with no load, or very lightly loaded. However, in applications with line shaft and a great deal of friction the motor may fail to start.

There are two general types of

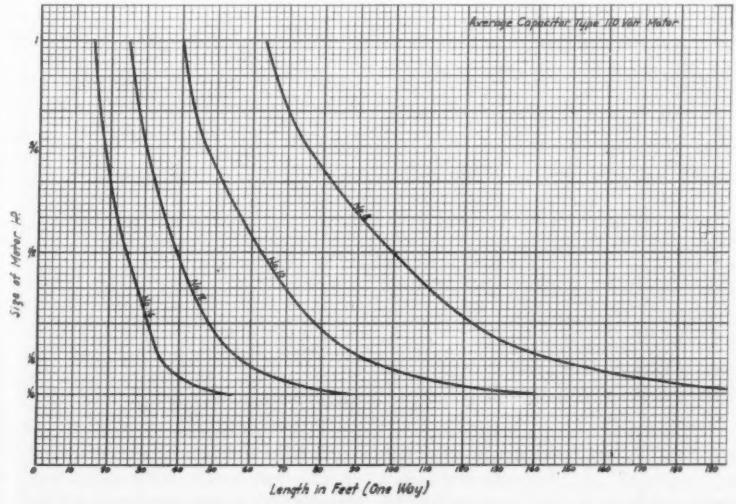


Fig. 6. The length of run possible for various sizes of capacitor motors and circuits without exceeding a 3% voltage drop at the panel board when the motor starts is illustrated in the curves shown here. . . .

starters, the auto transformer type and the resistance type. The auto transformer, or compensator type, is the most generally used, as it provides maximum torque with small line current. If it is set on a 70% tap, this provides approximately 70% current to the motor, but because of the transformer action the line current is only 70% of this, or 49% of the locked rotor value.

The usual auto transformer type breaks the circuit in changing from start to run. This may cause a disturbance equal to that of the motor starting. To overcome this, especially when more than one tap is desired, reactors may be placed across the taps giving much smoother results.

In Figure 2 are shown the characteristics of several of the various types of starters and controllers.

In Figure 3, the performance of a ¼ hp motor of three different types is compared. There is considerable difference in the performance of these three types. Figure 4 indicates the meaning of this difference of performance in terms of voltage drop and length of circuit from the distribution panel board.

The purpose of many of these special devices and motor designs is to limit the current required during starting and therefore the voltage drop. Excessive voltage drop resulting from a starting motor may affect either the motor or other equipment on the same circuit such as lighting.

The motor itself is usually guaranteed to operate satisfactorily on a range of voltage 10% above or 10% below normal. There is, of course, an appreciable difference in the performance of the motor over this band, especially in the torque and heating. Since the torque varies as the square of the voltage, a 10% drop in voltage will produce only 81% of normal torque. Ordinarily, there is enough leeway so that this will not be objectionable but in some cases it may be the difference between a satisfied customer and a dissatisfied one.

The losses and power factor may increase or decrease depending upon the relation of copper and iron losses.

The effect of voltage drop on lighting is rather involved, and space here does not permit extensive discussion. We all know from experience that the flicker of a light may be objectionable to some people and not noticed by others. This is not only caused by difference in people, but also in the conditions under which they are situated, and on the rate change of the voltage. If a person is working close to a lamp, he will notice the change quicker than one depending on the light for general illumination. You can decrease the voltage gradually on a lamp to 10% before it will be noticed, but if you have a quick change of 3 volts, it will be noticed at once. It is also necessary to consider the frequency of the disturbance. Naturally a disturbance once a day will not be as objectionable as one occurring every few minutes.

Figure 5 has been drawn up after a great deal of study, and a long series of tests. From this it may be seen why a motor may operate satisfactorily in one location and not in another.

In order to maintain proper voltage at the motor, sufficient capacity should be provided in the circuit. Figure 6 shows the wire size necessary to limit the voltage drop to 3%. Although Table 10 and 12, Chapter 9 of the Code permit a No. 14 wire for motors up to 1 hp at 115 volts, figure 6 indicates that it may not be satisfactory unless the length of run is 15 feet or less.

From the above it will be noted that if lights are on the same circuit as the motor, we must provide large copper. If the circuit supplies motors only, the permissible drop may be considerably more than 3%. However, when we get back to the distribution panel, we may have lighting circuits on the same feeder. Therefore, this drop must be kept within reasonable limits, and so on back through the service entrance.

From the above, it will be seen that no general rule can be given for the proper installation of motor wiring, except one of calculating the drop for each job.

Mass Atack By Industry Required In A-W Program

(*Continued from page* 25)

contractors and requests for the initiation of the program are being received from every section of the country. The establishment of local wiring bureaus will enlist all branches of the industry in those localities in a united educational program from which every electrical contractor will benefit.

"The individual contractor, however, need not wait for the establishment of a local bureau in his community. The direct-by-mail series of promotional material gives him a new approach to the home building prospect list on a salesmanship and service basis for adequate wiring jobs."

Campaign Produces Better Wiring In New Orleans

(*Continued from page* 28)

living, commensurate with the broad scope of the electrical industry and the importance of the subject of better wiring."

The folder contained pockets in which a pamphlet "Picturial Primer on Adequate Wiring," a blueprint showing specifications for wiring correctly and other suggestions were placed.

Meetings of the Electrical Association of New Orleans were held in June and August. At the former, George R. Conover, president of the International Association of Electrical Leagues, and managing director of the Philadelphia Electrical Association, was the speaker. O. C. Small representative of the National Adequate Wiring Bureau and secretary of the International Association of Electrical Leagues was the speaker at the second.

Durham, N. C., Scene Of Electricians Strike . . . . .

Demanding higher wages and shorter working hours, electricians of 10 Durham electrical shops announced a strike September 13.

The walkout followed a refusal of the shops to accept a new working agreement submitted by local union No. 553 of the International Brotherhood of Electrical Workers.

The electricians union here has a membership of approximately 30, including those employed in local industrial plants. Not all of them joined in the walkout, however, it was reported.

The working agreement which was rejected by the shops called for a five-day week, with extra pay for overtime, a set wage of $1.10 per hour for foremen and a wage of $1 per hour for journeymen.

Engineering

IN THIS SECTION:
Edison Institute Engineers Meet in Virginia.
Distribution Transformer Maintenance
Alabama Utility Announces New Projects

Distribution Engineers Meet In Virginia . .

THE fall meeting of the Transmission and Distribution Committee of The Edison Electric Institute was held at the Chamberlin Hotel, Old Point Comfort, Virginia, on Tuesday and Wednesday, October 11 and 12.

In order not to conflict with the regular sessions, two separate subject sessions under the sponsorship of the corresponding subject committees were scheduled for Monday, October 10. These meetings were open to any one interested.

A major feature of the meeting was the joint session with the Electrical Equipment Committee on Tuesday afternoon, at which several papers and reports on subjects of common interest were presented.

At the meeting on Monday, the Committee on Underground Methods and Accessories, sponsored by J. A. Brooks, heard discussions on: Recent Network Cable Tests, Recent Developments in Cable Fault Location, Gas-Tight Non-Porous Wipes on Lead Cable Sheathing, Impulse Dielectric Strength Tests, Discussion on Vertical Terminations of Paper Cable, Discussion of Cable Operation Reports, and Discussion of Network Operation Report.

The Committee on Distribution Economics, sponsored by Merrill DeMerit, met Monday afternoon for a discussion of Field Testing of Loads on Distribution Transformers.

Among the subjects included in the schedule of the Underground Group which met Tuesday morning were: Network Supply when Intermeshed from both Generating Stations and Substations, Semi-Underground Distribution System for Benton Harbor, Michigan, Discussion of Evansville Semi-Underground System, Cable Operation Report, and Network Operation Report.

Standardization of Distribution Transformers was the principal

(*Continued on page* 58)

Alabama Utility Announces New Construction Projects

ALABAMA Power Company recently announced a $383,000 improvement and addition program for its transmission and distribution facilities in Southeast Alabama. This amount covers only the major equipment which will be purchased or moved into the territory and does not include regular minor extensions and additions which are made from year to year and which will probably amount to several hundred thousand dollars more during the next 12 months, if business continues at present levels or improves.

Preliminary engineering work has been in progress for some weeks on the project, materials and equipment are already on hand or on order and active work in the field is scheduled to start about October 15 with view of completion about March 15, 1939.

This improvement program is the result of consideration given to the growth in the use of electric service in Southeast Alabama and to future prospects for this territory.

The project includes a partial rebuilding of the present high voltage supply line to Union Springs; the extension of 110,000 volt service as far as Eufaula; the reconstruction of the 44,000 volt line between Eufaula and Dothan, and extensive improvements and additions in and around Dothan.

Southeastern Exchange Engineers Meet in Birmingham

Members of the Engineering and Operations section of the Southeastern Electric Exchange were in Birmingham, Ala., Sept. 29-30 for their group's quarterly meeting. A feature of the session was an inspection tour of the Tennessee Coal, Iron and Railroad Company's tin plate mill at Fairfield. The photograph above shows the visitors as they arrived at the tin plate mill general office building after inspecting the Alabama Power Company's new sub-station at Fairfield . . . . . .

Distribution Transformer Maintenance

Birmingham Electric Company experience indicates that extensive load surveys are not always economically justified.

By G. W. McCracken*

Chief Engineer
Birmingham Electric Company

IT has been our observation in previous engineering meetings that in the discussion of any phase of the electric distribution system, mention is made of the necessity of making periodic tests and keeping records. We are not doing as much record work and load surveys as many of the other utilities. In fact, we have never sold ourselves on the idea of extensive tests and records, primarily because it requires considerable money to obtain and keep the information.

Study of the data collected would lead to the expenditure of capital that might be desirable but not necessary and not be in accordance with our principle of the best service to our customers at a minimum cost. In addition to our own records, we have to maintain records required by various governmental agencies. However, with the present business conditions, we should consider each item of expense on the basis of necessity and not of desirability.

Among the principal items of expense in the maintenance and operation of distribution transformers are the periodic load tests. Prior to 1928, the Birmingham Electric Company made an annual load test on all its installed distribution transformers. This load survey was made by a lineman and a ground man, and consisted of indicating ammeter and voltmeter readings on the secondary side of the transformer. An inspection was also made of the lighting arresters, fuses and condition of the transformer. The cost of making these load checks was about fifty cents per transformer; this cost has now increased to about one dollar per transformer.

We were not entirely satisfied with the results obtained from these tests, since the load, as reported, may have been taken at a period when the transformer did not have its normal peak load. The question was therefore raised as to the advisability of continuing these annual tests.

At that time, other methods of checking the load on our transformers were considered. One of the methods considered was the installation of indicating thermometers on each transformer. The objection to these devices was the cost of about $10 per transformer, and another objection was that we did not consider the instruments sufficiently accurate. It was finally decided to postpone these annual load checks for several years.

During the depression period, there was no necessity, from the overload standpoint, for making any general load tests on our transformers. In fact, we had an excessive transformer capacity, as shown on the attached tabulation.

Beginning with 1932, we started keeping a record of all our transformer outages, and the attached tabulation shows the outages that were reported due to overload. The annual cost of outages due to overload is an estimated cost which includes the time of the

*A paper presented before the fall meeting of the Engineering and Operation Section, Southeastern Eletric Exchange, in Birmingham, Sept. 29-30, 1938.

Birmingham Electric Company
Distribution Transformer Outages Account Overload

Year	Distribution Transformers In Service	Outages No.	Outages Per cent of Total	Character of Damage: Fuses	Character of Damage: Winding	Estimated Annual Cost Of Outages	Outage Cost per Transformer In Service	Ratio Connected Transformer Capacity To Peak Load of Substations
1932	3723	1	.027		1	$130.00	$ .0349	
1933	3717	3	.081	3		1.16	.0003	
1934	3713	4	.107	2	2	184.98	.0498	
1935	3696	6	.162	5	1	43.31	.0117	1.9
1936	3621	17	.469	4	13	913.39	.2522	1.56
1937	3798	27	.711	15	12	588.73	.1550	1.44
Average	3711	10	.269	5	5	$310.26	$ .0836	1.44

trouble man, the automobile expense, material replaced, and the replacement cost of any transformer that failed. It will be noted that the average cost of transformer outages due to overload is about eight cents per transformer in service.

Annual load surveys would have perhaps reduced the number of transformer outages but, based on previous experience, we doubt whether the outages would have been materially changed. Even though our distribution load has increased, it is questionable if an annual expenditure of from $3,000 to $5,000 could be justified in making distribution transformer tests in order to reduce outages due to overload. However, we might be justified in making a load check on the distribution transformers every five years in order to reduce the connected transformer capacity.

Loads Estimated Carefully

One of the best methods of keeping the distribution transformer capacity to a minimum is for the engineers that prepare jobs affecting changes in transformer capacities to be very conservative in estimating the load requirement for new customers and for customers who are increasing their load.

During the period from 1924 to 1929, inclusive, when our distribution load in Birmingham was increasing so rapidly, our policy was to install additional transformer capacity to provide for new customers and for customers that were using more service, so as to avoid the necessity of frequent transformer replacements. Due to the fact that during the depression the load did not increase, and in some cases there was a decrease in load, we have excess transformer capacity on our system.

We have experienced difficulty, with our limited construction budget, in our efforts to reduce the transformer capacity on our system due to the fact that, in most cases, it is necessary to make changes in our lines, which in a year's time requires a large capital investment. We have also found that it takes considerable engineering time to prepare jobs for the reduction in transformer capacity.

Since voltage complaints are frequently caused from overloaded transformers, we can, in a large number of cases, depend on these complaints to let us know which transformers are overloaded. This is particularly true now with the large number of electric refrigerators we have on the system. It is our practice to make load tests on our transformers where the customers are adding a substantial amount of load, and in connection with low voltage complaints.

These load tests are made with two types of thermal demand ammeters. One type has been mounted in an insulated box, and to make a test, it is connected across the primary fuse cutout box of the transformer and the fuse pulled. The primary current goes through the current element meter. This type of meter is used to test the load on the smaller sizes of transformers. This meter cannot be used in testing the CSP type of transformer.

The disadvantages of this meter are that it is inaccurate at light load, and also that it does not indicate the balance of load on the

Among the speakers and officials in attendance at the recent meeting of the Engineering and Operation Section, of the Southeastern Electric Exchange, were (reading from left to right and from top to bottom): E. R. Coulbourne and A. Mergenthaler, both of Alabama Power Co.; J. W. Talley, executive secretary of the Exchange; E. W. Whitmer, American Gas & Elect. Service Corp.; R. I. Butterworth, East Tenn. Light & Power Co., and chairman of the Section; R. H. Mangum, Alabama Power Co.; W. A. Moore, Miss. Power & Light Co.; and E. D. Treanor, General Electric Co.

Birmingham Electric Company
Distribution Transformer Outages Account Lightning

Year	Distribution Transformers In Service	Outages		Character of Damage					
				Fuse Blown Only		Damage to Windings		Other Damage	
		No.	Per Cent	No.	Per Cent	No.	Per Cent	No.	Per Cent
1932	3723	170	4.57	131	3.52	32	.86	7	.19
1933	3717	105	2.82	76	2.05	17	.45	12	.32
1934	3713	187	5.04	161	4.34	13	.35	13	.35
1935	3696	78	2.11	60	1.62	11	.30	7	.19
1936	3621	225	6.21	195	5.39	19	.52	11	.30
1937	3798	65	1.71	60	1.58	5	.13	0	0
Average	3711	138	3.72	114	3.07	16	.43	8	.22

secondary side of the transformer. The other type of thermal demand meter is used in conjunction with a split-core current transformer. With this type of meter, the load on the transformer is measured on the secondary of the transformer. Two meters are required to make a test. The test made with this meter is usually more accurate than with the other type of meter.

Our transformer shop and storage yard are located in the rear of our electric service building. The power crane runway extends 200 feet from over the railroad spur track, across the transformer yard into the repair shop. This shop is equipped with the usual transformer oil filters, pumps and oil storage tanks. There is also a drying out oven and painting equipment. One man and a helper do all the necessary work required in this shop and transformer yard.

On transformers of 15-kva and smaller that fail, we order from the manufacturer a complete set of coils and cores; and on the larger sizes, we order only the coil that has failed, and our shop men change the coil and restack the laminations. Transformers that fail, that were manufactured prior to the adoption of non-aging steel, are junked.

The old transformers are not junked unless they fail. We still have in service distribution transformers that were manufactured in 1897. We believe that one reason these transformers have lasted so long is due to the small clearance of the leads to the transformer case. These transformers are, therefore, self-protecting. The objection to them is that they blow too many fuses during lightning storms.

It has been recommended that we equip our transformer shop for re-winding the transformer coils that fail. This would necessitate the purchase of additional shop equipment and a large supply of wire and insulating materials. Also, an additional shop man would have to be employed. We do not think that the questionable advantages of having a fully equipped transformer shop on a property of our size could be justified with the increase in operating expense.

The transformers that have been in service for several years that come back through the shop are inspected, new leads and gaskets installed, the outside of the tank washed off with a clean-

(*Continued on page* 58)

Birmingham Electric Company
Maintenance and Operating Expenses Distribution Transformers

Year	Distribution Transformers In Service	Annual Maintenance Cost of Distribution Transformers Actual		Annual Cost Removing and Resetting Distribution Transformers Including Inspection & Testing Actual		Total Annual Maintenance and Operating Expenses Distribution Transformers Actual	
		Total	Per Transformer In Service	Total	Per Transformer In Service	Total	Per Transformer In Service
1927	2655	$ 8,601.42	$3.24	$5,027.14	$1.89	$13,628.56	$5.13
1928	3149	9,395.22	2.98	2,247.73	.71	11,642.95	3.69
1929	3492	8,790.74	2.52	1,271.18	.36	10,061.92	2.88
1930	3648	8,637.93	2.37	1,775.38	.49	10,413.31	2.85
1931	3748	9,644.10	2.57	1,141.26	.30	10,785.36	2.87
1932	3723	9,702.29	2.61	618.86	.17	10,321.15	2.77
1933	3717	7,444.84	2.00	499.36	.13	7,944.20	2.13
1934	3713	9,850.04	2.65	1,130.00	.30	10,980.04	2.95
1935	3696	10,164.65	2.75	1,054.56	.29	11,219.21	3.04
1936	3621	10,674.46	2.95	1,277.15	.35	11,951.61	3.30
1937	3798	11,584.09	3.05	2,254.79	.59	13,838.88	3.64
Average	3542	$ 9,499.07	$2.68	$1,663.40	$ .47	$11,162.47	$3.15

APPLIANCE Service

Electrical Water Systems Offer New Service Opportunities

By Allen Parker

ELECTRIC water pumps have for a good many years been considered as a major electric appliance. With the growing number of rural electrification lines, they are becoming more and more popular.

Obviously, the water pump field offers another opportunity for the service man to broaden his field of work. And, since neither the installation nor service presents a seasonal job it helps to balance the slack periods of the year. Some knowledge of the correct application and proper installation of pumps will be of considerable value to the service man who decides to seek business in this field.

The most common type of pump for domestic use today is the piston type, designed either for suction or deep well use.

The suction pump has been most popular, possibly, because it is lower in initial cost and installation cost. As the name implies, it is a pump that is located at the surface of the ground or somewhere above the water level and pumps the water by suction. The suction method consists of the elimination of pressure in the drop pipe to the water with the result that the outside normal atmospheric pressure forces the water up to the pump for compression in the storage tank.

This pump theoretically will raise water 27 feet at normal air pressure at sea level. However, the application is not recommended for a lift of more than 22 feet. The difference compensates for the friction of the drop pipe, fittings, ells, horizontal runs, altitude and etc., as well as the loss in efficiency which the pump will eventually develop from normal wear.

When a suction pump requires frequent service calls, the cause can usually be traced back directly to misapplication. For example, the lift may be too great and it may become necessary to continually replace the cup leathers and valves in order to maintain efficiency sufficient to do the job.

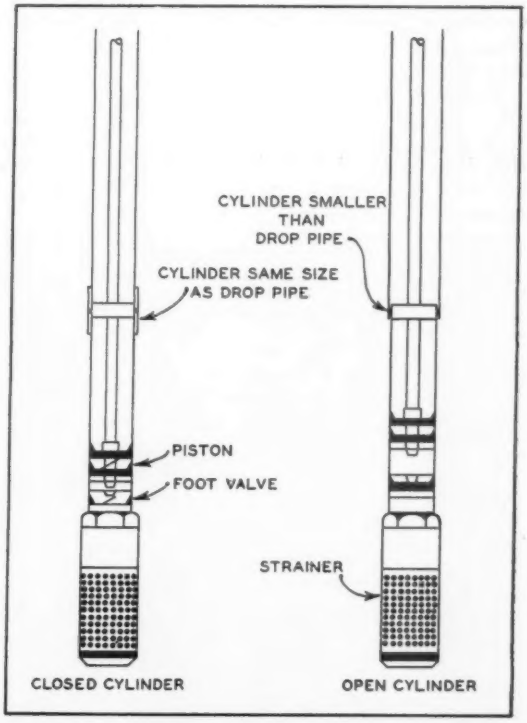
In some instances, the pump is lowered into the well 15 or 20 feet in order to lift the water from a deep well. The natural result is an increased head pressure at the discharge of the pump if the original pressure is maintained at the surface. Such an overload may result, also, in many repair calls. On the other hand, a suction pump properly applied, with precautions to keep it from freezing, may be considered a dependable appliance.

A deep well pump has the cylinder and piston submerged below the water level of the well on the end of the suction pump. The piston is operated by a suction rod which extends from the pump mechanism at the surface down the suction pipe to the piston. This type of pump will lift water from a depth of a few feet or several hundred feet.

Two Types of Cylinders

A deep well pump can be supplied with two types of cylinders. One is called the closed cylinder, and the cylinder has the same diameter as the drop pipe. Should the valves or cup leathers in this cylinder develop trouble or need replacing, the entire length of rod and drop pipe must be removed to get to these parts.

The open type cylinder has a drop pipe approximately ¼" larger than the cylinder. This permits the pump rod to be disconnected from the pump and lowered until the piston on the other end rests on the foot valve. The rod can then be screwed on the piston and foot valve and they can be pulled to the surface for repairs or replacements without pulling out the drop pipe.



From a service point of view, the open cylinder type deep well pump is more desirable than the closed cylinder type. Principal advantage is that piston and foot valve can be raised to surface for repairs without pulling drop pipe.

From a service standpoint this appears to be the cylinder to use although apparently there are more closed cylinders sold. Undoubtedly, this is the result of close competition, and the extra saving in the initial cost of the drop pipe for an open or closed cylinder might mean the lowest price and award of a sale. I am sure that any customer would appreciate an explanation from the dealer before he purchased and would gladly pay the difference if he knew of the greater savings over a period of years that would result from the use of the open cylinder type.

The service man is likely to encounter many unusual service calls in this field. As an example, one customer purchased an unusually large suction pump and placed it on a large spring at the surface of the ground with practically no suction lift and only four or five feet of suction pipe.

This pump continued to "water log," that is, it failed to pump enough air to act as a cushion and force the water out of the tank. Two or three service calls had been made, each one indicating that the air was short, and each time the automatic air intake valve was found to be in good shape and apparently working satisfactorily.

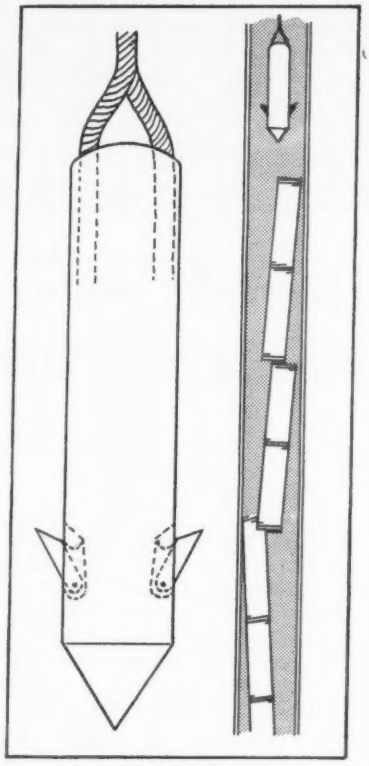
However, the decision was finally reached to add some resistance to the water intake or suction line in the belief that more air would be taken in through the automatic air valve. This resistance was added by the installation of fifteen more feet of suction line which was made in the form of a rise, a horizontal run and then a drop back to the pump. This solved the problem and this new installation has not given any more trouble.

Another interesting problem was involved in the servicing of a deep well pump. A small municipality purchased a 5 hp electric deep well pump. It was installed on a 10-inch well, 430 feet in depth. The drop pipe was 3½ inches in diameter and of 300 feet in length, being made up of 10-foot lengths, weighing 98 pounds each.

This pump operated satisfactorily for several years and then the drop pipe was pulled for repairs to the cylinder. This was a relatively expensive job for this small city and when this same trouble appeared again, later on, the officials of the city decided to use their own labor and save some expenses.

The sad part of the story is that after all but seven lengths of the pipe had been pulled, it slipped through the block clamps and fell to the bottom of the well. It was later found to have broken into three pieces. The removal of these sections of pipe from the well presented a nasty job.

After the city officials had made a futile attempt for two days without success they requested that we remove it regardless of cost. I promptly admit that, at the time, we knew of no method of removing it; neither did we know of any tool that might do it. However, we studied the situation carefully and then designed a special tool on which the machine work alone cost us $25.00.

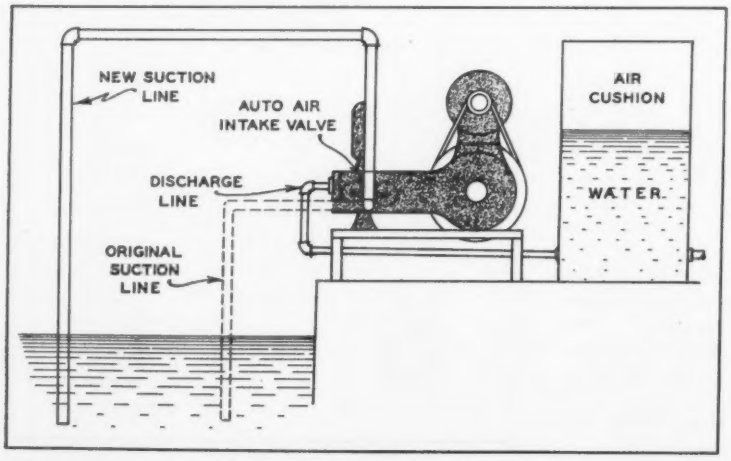


The specially designed tool shown here proved particularly useful in removing broken sections of pipes. . .

This tool, shown in an accompanying illustration, was made of a piece of cold rolled steel machined down to 2½ inches in diameter and 30 inches in length with the bottom end beveled down to a point. The top was made into an eyelet and grooved on each side to permit the attaching of a cable without increasing the diameter of the tool. Near the lower end two slots were cut approximately ¾ inch in width and 2½ inches in length. The depth of the slot was 1 inch at the bottom and ½ inch at the top. In these two slots were mounted two pieces of case hardened steel, ground to fit. They were fastened at the top of the slot with a semi circular piece of steel clock spring. This spring held the bottom end of the steel dog in the tool when the top was expanded outward.

We figured the tool could easily

(*Contniued on page* 40)



Misapplication and improper installation are the causes of most water system troubles. In the example shown here, a large pump was installed with a very short suction line. A longer suction line, as shown, permitted proper operation of the automatic air valve. . .

MOTOR Service

Small Points of Importance In Armature Winding

5—*Strips Under Core Bands*

By A. C. Roe

Railway Motor Engineer
Westinghouse Electric & Mfg. Co.

REALIZING that many winders fail to appreciate the importance of many minor factors in armature winding and insulation, Mr. Roe, author, engineer, and practical workman, has written a series of short articles, discussing only one phase of the subject at a time. The following article is the fifth of this series. Other articles of the series appeared in the July and succeeding issues.

THE cores of many direct-current motor armatures are provided with grooves, into which are wound the steel banding wire to form the core bands. To insure tight permanent bands there are two factors that require careful attention: (1) tinned steel strips and (2) their insulation from the core.

An armature with four grooves to receive the bands that will firmly anchor the slot portion of the coils is shown in Figure 1. There will be a band at each end of the core, and two equally spaced between the end bands.

These core bands can be applied by various methods, but the following method has been adopted as being the most satisfactory:

First, it has been found desirable to insulate the band from the iron of the core in order to reduce heating of the band from eddy currents. Asbestos tape 0.010 inch thick is used for this purpose because it is soft and easily compressible and because it is not affected by the heat of soldering the band, and will not shrink, char, or crumble away at ordinary operating temperatures. A strip of asbestos tape is shown in position at the right center.

Second, experience has shown that the most secure band can be obtained by applying the tinned steel wire over a strip of tinned steel 0.012 or 0.018 inch thick. These tinned steel strips are cut to the same width as the band groove and applied around the circumference of the core, as shown at the left center, Figure 1. They present a uniform, smooth, hard surface on which the steel banding wire can be applied; thus the adjacent turns can be drifted over tight. Then, when the outer surface of the band is soldered, the section of the wire in contact with the tinned steel strip is sweated to it, and solder run between the turns of wire, building up the strip and filling the voids.

The final results bring a strong, solid, composite band, consisting of steel wire, sheet steel, and solder. Thus, the area of contact or adhesion between turns of wire is increased by the strip of tinned steel. This type of band when soldered might be termed a double band.

In applying this type of band, the asbestos tape is run on first; then the small narrow tie clips (of tinned copper or steel) are inserted over the tape, but under the steel strips. These tie clips are placed in the slots over the coils so that the two tinned surfaces are in contact. They are thus sweated together when the band is soldered, and maximum area of contact and holding strength is obtained.

Placing the tinned tie clip in the slot instead of in the tooth results in a uniform pressure in all the coils. If they were placed on the tooth, the bands would be raised up, and the coils on each side of the tooth would rise a like amount. There is generally suf-

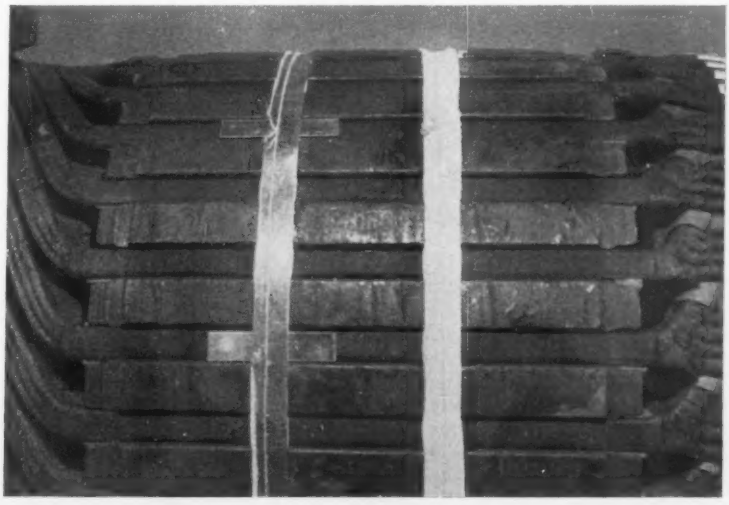


Fig. 1. Correct procedure in banding cores is shown here. Asbestos tape is placed in the groove first (middle right); tinned clips are inserted at intervals; then the tinned steel bands (middle left); and finally the wire itself is wound on. All are then soldered. . . .

ficient "give" to the coils to permit the clip bedding down level with the core when clips are placed in the slot, as shown.

Thus there are really four small items that, when properly handled, pay dividends in strong, solid, tight, permanent core bands, which remain so for a long time.

What Do You Know About Motors? . .

By A. C. Roe

CHECK your knowledge of motor characteristics and repair methods by means of these "True or False" statements. Use your pencil and underline your answer as to whether the statement is true or false; then turn to page 55 for the correct answers.

(1) On a straight series motor, one short circuited field coil will be hotter than the others. True or False?

(2) On any four-pole wave wound armature the dead connection can be made to form either a progressive or retrogressive winding. True or False?

(3) On a wave wound armature, a change from a progressive to retrogressive winding or vice versa will increase the speed? True or False?

(4) On a six-pole wave wound armature a progressive or retrogressive connection is obtainable with the same number of bars. True or False?

(5) Cold copper magnet wire has a lower resistance in ohms than hot copper. True or False?

(6) A delta-connected stator winding of an induction motor requires more turns than a star-connected winding. True or False?

(7) Untinned sheet copper is the best material to use for clips when banding armatures. True or False?

(8) On small hand wound armatures a reversed lead in lap windings can be detected by the bar to bar test. True or False?

(9) On slot fit coils, paraffin is the best lubricant to use when driving the coils into the slots. True or False?

(10) On high or medium speed d-c armatures it is good practice to put tie clips between the end core bands and the bands over the coil ends to prevent end bands from slipping? True or False?

(11) On modern high speed d-c armatures non-magnetic banding wire is used to reduce eddy current losses and band heating to a minimum. True or False?

(12) When winding coils into a stator or rotor, a fiber drift of the same length as the coil side should be used to drive the coils into the slots? True or False?

(13) For shaping the ends of insulated coils during armature winding process, steel drifts are less harmful than wood or fiber. True or False?

(14) Fused iron in the slots of d-c armatures resulting from grounds, if of large area, will cause the sheet steel finder used on growler test to stick or vibrate at these burnt teeth? True or False?

(15) When applying the bands over the lead ends of d-c armatures, the direction of application should always be from the core towards the commutator. True or False?

(16) On d-c lap wound armatures, the type of winding most widely used is the retrogressive type. True or False?

(17) When banding any rotor the best method of securing proper wire tension is to clamp the wire in fiber or wood blocks. True or False?

(18) When winding d-c armatures it is generally good practice to lift 3 to 5 top coil halves ahead of the top halves of the throw coils, in addition to the throw coils. True or False?

Electrical Water System Service Opportunities .

(*Continued from page* 38)

find the pipe because the beveled end made it self-centering. With the dogs in the above position, they would be compressed as they entered the pipe and would expand once they were pulled upward, and would then lock on the first coupling of pipe or any rough projection.

We were very anxious to try this tool. Since there was so much weight involved, it was necessary to obtain and use a heavy-duty winch truck. We could not locate a steel cable, at the time, long enough to do the job, so we purchased a 500 foot roll of one-inch manila rope. This was bulky to handle on the winch but we managed to use it, and with three successive pulls, each time bringing out two or three sections of pipe (the pipe had broken into three sections when it fell), we completed the job in record time.

The cylinder on the bottom end of the pipe was completely demolished and several lengths of pipe were ruined. The replacement of these parts and reassembly of the pump required approximately three additional hours and the town again had water.

New Water Pump Has Desirable Operating Characteristics . .

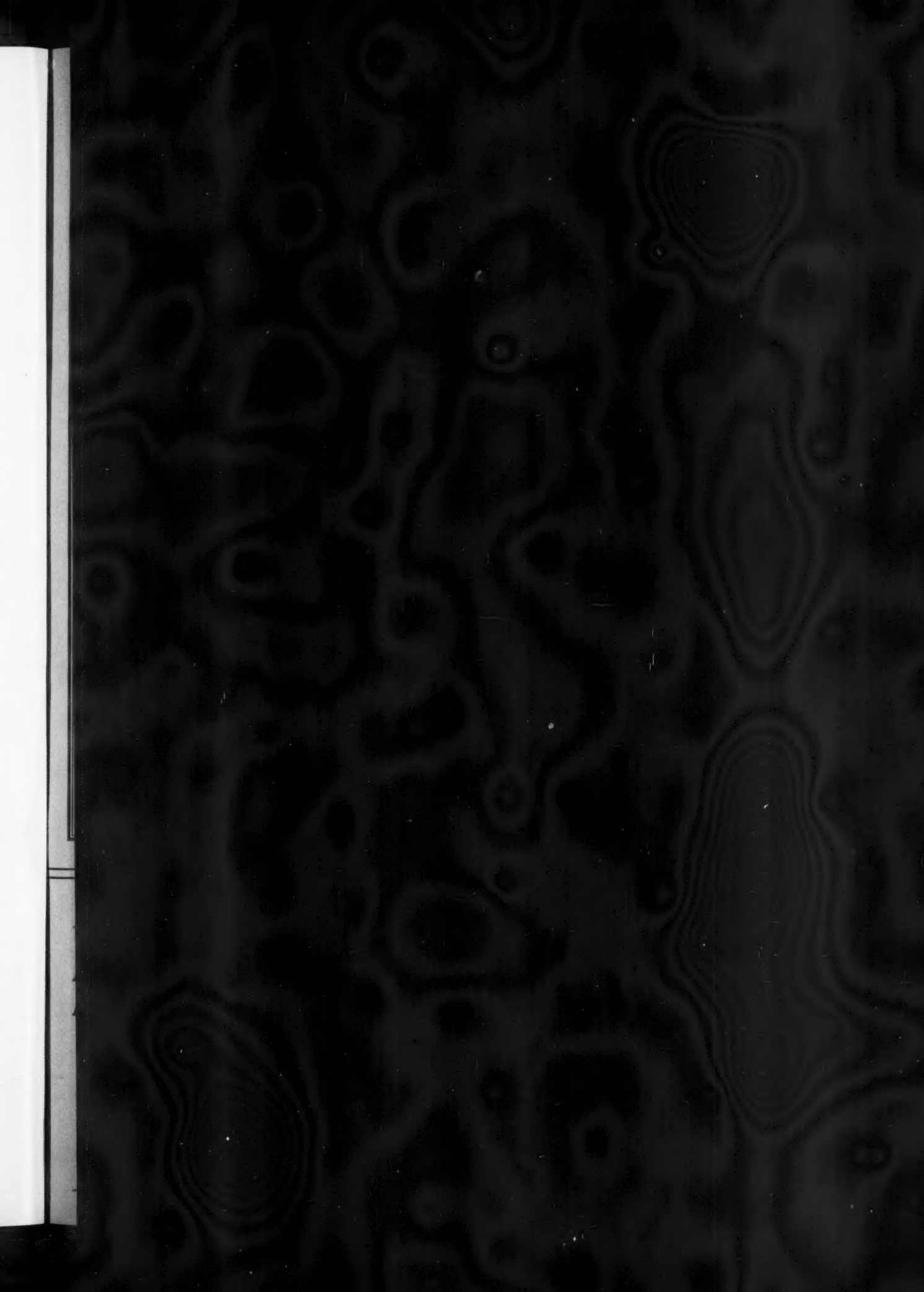
A new water pump for domestic purposes has recently been placed on the market and promises to be very popular. The manufacturers having stressed simplicity of design and operation. The principal is a centrifugal pump mounted in a vertical position over the well. The discharge outlet is arranged so as to return part of the discharged water under pressure down to an injector installed on the drop pipe in the well. This injector directs the water through a nozzle into a return tube. This creates a suction chamber around the nozzle. Water flows in and is forced up the return pipe to the centrifugal pump for discharge.

The pump is suitable for either shallow or deep well pumping. Pumps are supplied either single or multi-stage, low or high pressure discharge.

Self Cleaning Bearings Earmarked Now By Manufacturer . .

Because so many electrical maintenance men periodically dismantle motor ball bearings to clean out old grease, a red tag is now attached to Westinghouse grease lubricated ball bearing motors stating that this practice is unnecessary. The motor bearings are self cleaning, being provided with an overflow sump into which the used grease is automatically deposited.

On the tag, a cross section of a bearing shows how fresh grease forces the old into the sump. Excess or used grease is easily removed through an opening equipped with removable plug. The overflow sump also provides a pressure relief which prevents overgreasing when the simple instructions accompanying the motor are followed.



We Can Help
You Do Your Buying

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TELL US WHAT YOU WANT AND WE CAN SAVE YOU TIME AND POSTAGE

The manufacturers who advertise their products in ELECTRICAL SOUTH are obviously making a special and direct effort to secure southern business. These manufacturers, in nearly every case, have representatives located throughout the South and have distribution facilities to give the southern trade prompt and efficient service.

Look over the items advertised and described in this issue of ELECTRICAL SOUTH and if you will tell us the ones in which you are interested, we shall be glad to have manufacturers send you further information about them.

You will find listed on the back of this page the firms whose goods are advertised. A number is placed immediately preceding each name. On the post card below are shown corresponding numbers. All you have to do is to circle or check the numbers on the card that correspond with the numbers which precede the names listed on back of this page. Mail the card to us. It requires no postage. We will gladly forward your name to the manufacturers indicated by the numbers checked and ask them to send you additional information.

No Postage Required . . .

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ELECTRICAL SOUTH

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ATLANTA, GA.

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CHECK OR CIRCLE NUMBERS—SIGN—MAIL

November, 1938

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18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34
35 36 37 38 39 40 41

Name _____ Title _____

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Readers' Service

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Often our readers would like to secure additional information on certain lines advertised in the paper but do not have the time to write for it.

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ASSOCIATION Activities

New Range Wiring Costs Announced In Washington

A STANDARD wiring cost of $35 has been adopted for electric ranges by the Electric Institute of Washington, D. C., the charge to be included in the established retail list prices of the ranges.

The plan was worked out after a court ruling enjoined the Potomac Electric Power Company from making a contribution to range wiring which, under the previous plan, had made possible an installation charge of $15.

Under the new arrangement the customer is quoted a retail list price which includes the cost of wiring. The contractor receives $35 of this price whether rigid conduit or service entrance cables are used. In the District of Columbia rigid conduits are required by ordinance. The power company supplies the conductors where conduits or raceways are required. The standard cost of $35 varies only in the installation of ranges which have larger than 60-ampere main entrance switches in which cases an additional charge is made.

It is estimated by J. S. Bartlett, managing director of the Institute, that rigid conduits will be required in only 50 per cent of the installations. This will enable the contractor to make a profit on the service entrance cable installations, points out Mr. Bartlett, which will level off the cost of the rigid conduit jobs. Rigid conduits are not required in territory adjacent to the District served by Washington contractors.

A feature of the plan is that the range dealer receives a discount on the wiring in excess of the $35 allotted to the contractor. This amount varies with the different wholesalers. This percentage was not in effect under the former range wiring agreement.

An accumulated demand for ranges has already been recognized since the adoption of the plan. During the past six months sales promotion has been slowed down by lack of a wiring agreement.

Leagues To Hold Third Annual Conference

THE International Association of Electrical Leagues will hold its Third Annual Conference on Thursday, November 17, to Saturday, November 19, inclusive, in the auditorium of the Electrical Association of Philadelphia, Architects Building, 17th at Sansom Street, Philadelphia. The program committee, appointed by George R. Conover, president, met on September 15 to complete details of the conference.

The opening address will be presented by H. P. Liversidge, president of the Philadelphia Electric Company, and the balance of the first day's open meeting will consist of a review of the industry's principal cooperative promotional activities by their national leaders. "Fair Trade Agreements and Practices" and other subjects of interest to league members will be discussed by leading authorities.

The program for the morning of the second day, which is also an open meeting, will include such topics as "Service Possibilities of Leagues and Opportunities for League Managers" and "Fundamentals of Merchandising Electrical Appliances."

Ample time will be allowed for discussion following each of the formal addresses on the program for the open sessions.

The Friday afternoon and Saturday sessions will be for league managers only and will be devoted to informal discussions of league managers' problems. Election of officers of the I. A. E. L. and other organization business are scheduled for Friday afternoon.

A cordial invitation to attend the open meetings is extended to representatives of utilities, manufacturers, wholesalers, contractors and dealers, and others interested in local cooperative promotion.

Refrigerator Campaign Boosts Summer Sales

UTILIZING a comprehensive sales campaign and slogan contest, electrical refrigeration retailers of New Orleans, through the Electrical Association of that city, fought off summer doldrums and the business recession with the result that unit sales for the city were far above the national average.

As a result of the contest and campaign, which extended from July 1 to August 13, electrical refrigerator sales in New Orleans during that period totaled 678.

This figure was 28 per cent below sales for the same period of 1937, as compared with a 50 per cent decline reported for the entire country for the same period.

The campaign included a series of seven newspaper advertisements of almost a page each to run in four papers, or a total of 28 insertions on different days. These stressed the economy of purchasing and owning electrical refrigerators as well as carrying invitation to householders to take part in a slogan contest to determine winners of 25 refrigerators.

Radio announcements with eight spot announcements a day for three weeks were broadcast over two of the larger New Orleans stations. These also stressed the contest, which involved answering the question—"Why is an electric refrigerator cheap to buy —cheap to use?"

The campaign was launched with distribution to salesmen of a handsomely-prepared prospectus printed in blue and purple on heavy, pink board. Breakfasts attended by nearly 300 salesmen were held every second Tuesday during the campaign. A follow up method for salesmen tied in with the contest and the advertisements.

Washington Dealers Launch Range Sale

TWO hundred dealers and salesmen attended the "Tune Up—Warm Up" Breakfast which launched the latest range cam-

(*Continued on page* 55)

CODE Discussion

Louisiana Chapter Code School Proves Unusual Success

By Geo. Welman
Electrical Inspector

THE hobby of the electrical inspector is Code study. The inspector studies the Code for several reasons. He knows that the Code is an American Standard and that the more familiar he becomes with this Standard the more valuable he and his appraisal value becomes in industry. However, a study of the Code does not mean to memorize it verbatim. The ability to repeat sections of the Code in parrot-like style is no indication that an inspector is familiar with electrical construction problems as they affect the contractor or the current user.

A study of the Code that enables one to grasp the meaning of the rule is the ideal method in Code instruction. This form of instruction enables the Code student to participate in actual Code making. The student gradually suggests improvements here and there in the Code and learns why his ideas may appear to be sound to him but affect others adversely.

At the Louisiana Chapter Code School, conducted during the winter and spring of 1938, the student was instructed in Code making as well as Code following. The school was conducted two nights each week during an intensive training period and, now, is a part of the monthly meetings of Louisiana Chapter.

B. Z. Segall, the secretary of the Chapter, acted as instructor. We were fortunate in securing the services of Mr. Segall and the use of the auditorium of the New Orleans Public Service, Inc. Mr. Segall had had considerable experience in Code school instruction as he had reviewed the entire Code at a school conducted for employees of the New Orleans Public Service, Inc.

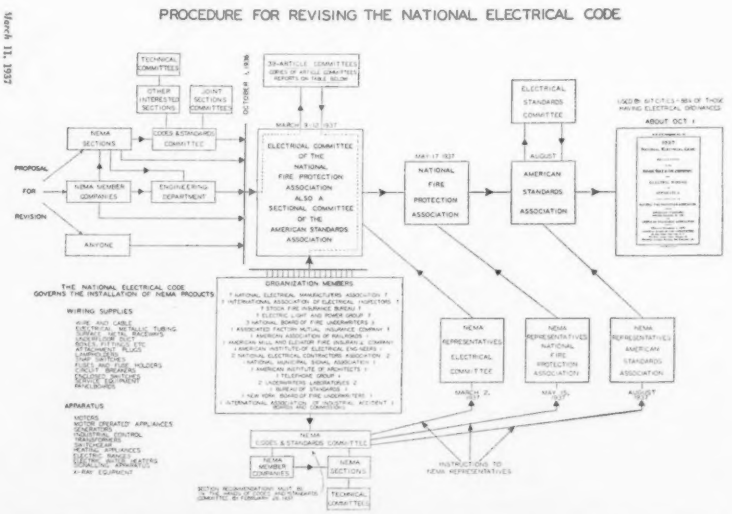
Each lesson was prepared in advance and instructions adhered to class room procedure using the Code as a text book. Those in attendance were cautioned that no one lesson was complete and that constant attendance at all classes was essential in order to become proficient in applying the rules. As a result, the attendance averaged approximately 175 persons throughout the course.

Mr. Segall used the blackboard in illustrating practically every rule. Wiring diagrams, electrical calculations, transformer and motor connections, were all profusely illustrated. Engineering details as well as technical Code requirements were taught. It was certainly gratifying to see a utility company take such an interest and contribute so much towards standard interior construction, dispelling entirely the idea expressed by some persons that utility companies are interested only in the service and tamper proof meter connections.

The majority of those in attendance consisted of contractors, jobbers, utility company employees, manufacturers representatives and electricians.

One of the first lessons covered Article 210, which refers to branch circuits. A discussion of this article through our Code school open forum, revealed the opinion that mandatory demand factors might be of doubtful value and that most users of electrical current were still democratic enough to resent a compulsory method of furnishing them with adequate facilities for the use of electric current.

Some persons expressed themselves quite freely about dictatorial electrical rules that might create distrust on the part of purchasers of electrical current and a wrong conception of the intent of the Code which would result in undoing much of the good that has been accomplished in the past.



That the National Electric Code represents the concensus of opinion of the best electrical minds is well emphasized in this chart showing the procedure and channels utilized in revising it. . . . . .

Some groups who gathered after classes seemed to think that compulsory outlet requirements should be in the shape of recommendations.

It was also brought out that if the Code was to provide all the "ifs" and "ands" in electrical construction methods, contractors would be at considerable disadvantage in using their own selling ability to promote wiring adequacy. Another viewpoint that had considerable support was that some contractors did not care to trouble themselves to sell adequacy and therefore must have it forced upon them.

A discussion on salesmanship revealed that a salesman is a person who is able to convince a customer and that the salesman himself does not make the sale; the customer sells himself. Therefore, mandatory demand factors will not make a "customer salesman" but, on the contrary, may result in a disgusted customer.

Inspection Cost Discussed

There was also some mention of the increased cost of inspection and contractors were informed that the cost of inspection did not concern them but was paid for by the person who installed the wiring. Some contractors do not wish to create the impression that they are not interested in the customers welfare and claim that as they represent the person who employs them to install the wiring and fixtures, it is a natural desire on their part to safeguard the interest of the user of current in every respect. This being ethically correct then any mandatory requirements that materially increased the cost of inspection service, because such requirements compelled inspectors to supervise engineering work not purely within the scope of determining existing hazards, would be considered as an unnecessary burden on the current user.

It is a well known fact that the time involved in making an electrical inspection is gradually increasing and if inspectors are to enforce demand factors based on building dimensions, spacing between outlets and such features, the making or checking of such a survey will involve considerable time not at present spent in making electrical inspections.

As a matter of fact, the inspector and the Code should not design an electrical installation. The introduction to the Code states "This Code is to be regarded neither as a design specification nor as an instruction manual for untrained persons." It may be that we are going too far with certain demand factors and outlet specifications and are bordering on actual design if we are not already in that field.

Inspectors Favor Adequacy

In discussing demand factors, adequacy and other standardization features, it is well to remember that inspectors have always endeavored to sell adequacy and have often succeeded in convincing the user of current that adequate capacity in circuits and conductors are necessary in order to assure safety and efficiency. Inspectors preached adequacy long before others ever thought about it. It is only since saturation is beginning to be reached that adequacy has been studied by the industry in general.

The demand factor requirements in the Code have served a useful purpose in awakening those who are inclined to let the inspection department do the selling job for them; and after serving such a useful purpose they may be deleted, especially if the constituents of a political subdivision demand repeal through local ordinance.

Even with the present Code there is no reason for any local ordinance repealing the entire Code and if inspection departments use good judgment there will be no complaint. Any inspection department may issue qualified or unqualified approvals for the use of current. A qualified approval might state that the installation is reasonably safe and conforms to city ordinance except such adequacy demand factors as specified by the Code. Such approvals are generally accepted by the architect or current user and relieve the inspection department of any unfavorable criticism.

Such bodies should, by all means, retain the National Elec-

(*Continued on page* 55)

Official Interpretations Of National Electrical Code

Interpretation No. 139

Question: In the final sentence of Section 2108 of the 1937 edition of the National Electrical Code, which reads: "Where circuits supply continuous loads, such as store lighting and similar loads, the load shall not exceed 80 percent of the branch circuit rating" what is meant by the expression "continuous loads," and by the expression "branch circuit rating?"

Answer: The expression "continuous load" is intended to signify uninterrupted use of current by the load in question for a period sufficient for the maximum temperature rise on account of current to be reached. The authority enforcing the Code must determine under what circumstances the 80 percent limitation applies.

The expression "branch circuit rating" refers to the current values given in the titles for the several kinds of branch circuits described in the article; for example, 15 amperes, 20 amperes, 25 amperes, 35 amperes, and 50 amperes.

Interpretation No. 142

Question 1: Does Section 2331 or any other section of the 1937 edition of the National Electrical Code, prohibit the installation of Type SE service entrance cable concealed in the hollow spaces of frame buildings?

Answer: No.

Question 2: Does the fine print note of Section 2331 also refer to Type SE service entrance cable?

Answer: Yes.

Interpretation No. 143

Question: Was it the intention of the Electrical Committee, in the rearrangement of the National Electrical Code, to have paragraph 3885 of the 1937 edition prohibit having switches on the load side of plug fuses on panelboards except for service equipment as in Section 2375?

Answer: No, the intent was to prohibit such use of cartridge fuses as in paragraph c of Section 1303 of the 1935 edition of the Code and also of link fuses.

Interpretation No. 144

Question: Does section 2505 or any other section of the 1937 National Electrical Code prohibit the grounding of 440-volt services?

Finding: No.

Interpretation No. 146

Statement: A two-story and basement building is occupied on the first floor by a grocery; the second floor is occupied as a residence. The second floor is not accessible from the first floor, its stairway being outside (the owner of the store lives on the second floor).

Question: May this building and occupancy be recognized as a multiple occupany, referring to paragraph b of section 2302 of the 1937 edition of the National Electrical Code?

Finding: Yes.

WHOLESALERS' Activities

New Quarters Occupied By Miami Wholesaler . . .

Major Appliances, Inc., wholesale distributing firm of Miami, Florida, recently celebrated its second birthday by moving into enlarged sales quarters and warehouse at 925 West Flagler Street. The general offices of the company were formerly located at 839 West Flagler Street.

The occasion was also celebrated by a dealer meeting which attracted dealers from all over the state. The meeting gave dealers an opportunity to get acquainted with the firm's new location and facilities. It was concluded in the evening with a gala birthday party, climaxed by prize drawings for dealers and their salesmen.

The company now represents a number of electrical manufacturers, several lines having just been added. They have state distribution of RCA Victor records; Southeastern territory distribution of RCA instruments, sound equipment and tubes; state distribution on Leonard refrigerators; state distribution on Temco heaters; state distribution of L & H gas ranges and L & H Kerogas heaters for both bottled and manufactured gas; state distribution for the Hotstream automatic gas heater for both bottled and manufactured gas; state distribution for Sepco electrical heaters; state distribution with the exception of a small Tampa territory for Easy washers and ironers; state distribution for Victor Electric fan products; and state distribution for Chambers ranges.

In addition to the general offices and warehouse in Miami, the company maintains an office and warehouse in Jacksonville at 222 E. Bay Street, and a warehouse in Tampa at 12th and Whiting Streets. Walter D. Rowlands is president of the firm and George B. Gray is sales manager.

Major Appliances, Inc., of Miami, celebrated its second anniversary by moving into a new building providing greatly expanded facilities.

G-E Supply Salesmen Meet In Richmond .

Salesmen for the General Electric Supply Corp.'s Virginia-North Carolina district assembled at the Hotel John Marshall in Richmond recently to map plans for the corpotion's "Golden Opportunity Sales Harvest," which started last month and is to continue until December. Boyd A. Propert, Virginia-North Carolina district manager, presided.

Among the guests at the meeting were J. C. Pentecost and W. N. Nagel, both of Atlanta; Charles Bassett and R. N. Riley, both of Richmond; and G. G. Harney, of Charlotte.

Because he had hung up the best sales record of the past season, Sam Waddill, of Norfolk, was awarded an electric shaver.

Dallas "Gesco" Group Scores In "Triple Play" Drive

About 50 members of the General Electric district appliance sales organization and of the General Electric Supply Corp. of Dallas, Texas, dined in honor of the latter group recently when they received the silver cup for leadership in the southwestern district of the G-E "Triple Play" campaign on washer and ironer sales. Left to right, seated: Raymond Lawler, San Antonio salesman; E. S. Richardson, Dallas salesman; R. V. McDonald, G. E. Appliance sales district manager; G. C. Wasson, Gesco southwestern district manager; W. H. Fuller Jr., Gesco branch manager in San Antonio; E V. McNeese, territorial salesman; Harry C. Hill, Fort Worth salesman. Standing, William Kearney and C. E. Akin, territorial salesman; Lou Joffmaster, Gesco appliance sales manager for the district; L. T. Day, G-E home laundry specialist; Jack Bates, and Hugo Werner, territorial salesmen. . . . . .

Birmingham Wholesaler Makes Organization Changes . . .

R. P. McDavid & Company, Inc., of Birmingham announced recently that its Kelvinator account for Alabama and West Florida had been taken over by the factory and would be operated as a factory branch in the future. The McDavid Company will concentrate on its other wholesale lines which include RCA Victor radios, ABC washers and ironers, RCA Victor records, L & H ranges and water heaters, Rex Air-rate fans, Robbins & Meyers fans and other accessory lines.

The Kelvinator Company has opened a service and parts depot at 509 N. 22nd Street, managed by Joe

Grissom, former service manager for the McDavid Company. The district manager for Kelvinator in charge of the branch is James B. Johnson. An assortment of used stock is being sold under the name of Magic City Appliance Company, with E. H. Abernethy, formerly with the McDavid Company, as manager.

The McDavid Company will continue to occupy part of its old location in a building adjoining the Birmingham Electric Company. R. P. McDavid, president, said that he retained his entire sales organization in the change. He had formerly operated a retail as well as wholesale business, but will now be exclusively wholesale.

Brower Company Moves Into Well-Planned Building . .

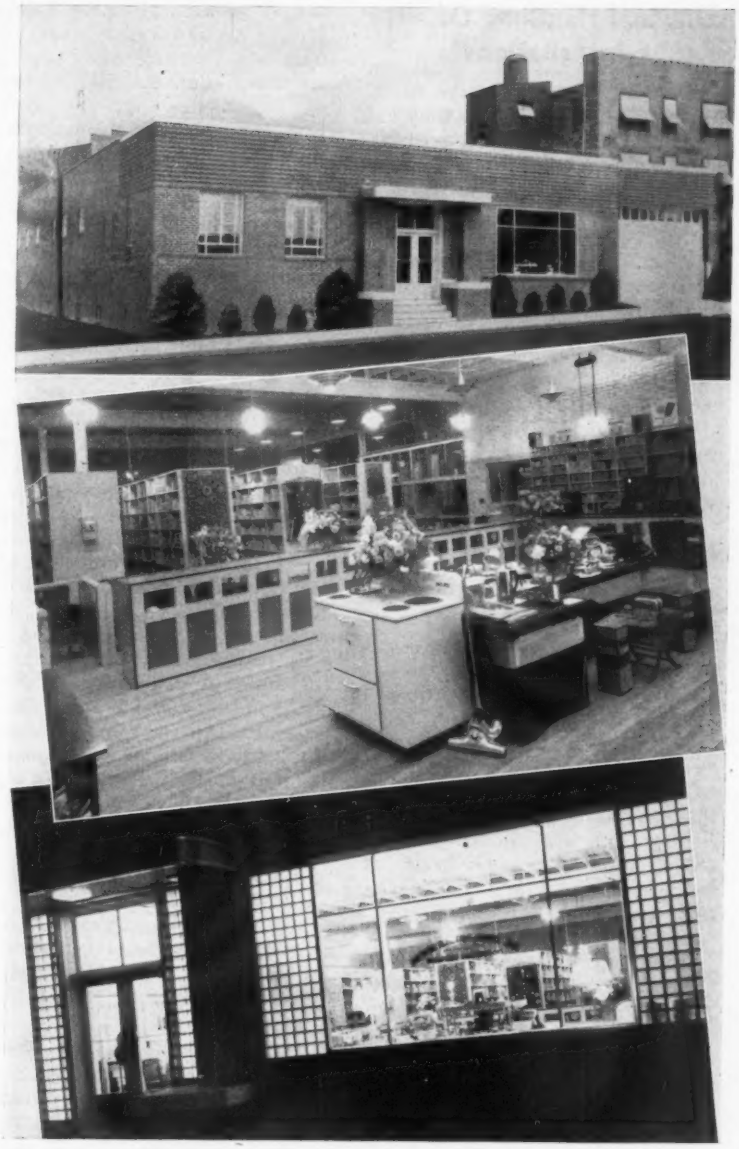
Formal opening of the Brower Electric Supply Company, Inc., of Greensboro, N. C., was held recently in the company's new building at 312-314 North Eugene Street. Headed by R. M. Johannesen, president and general manager, this electrical supplies distributing firm represents a number of well known manufacturers, including National Electric Products, Inc., Arrow-Hart & Hegeman Electric Company, American Steel & Wire Company, The Bussman Manufacturing Company, Buffalo Forge Company, Wheeler, Reflector Company, John C. Virden Company, Central Tube Company, Hygrade Sylvania Corp., The Art Metal Company, Providence Insulated Wire Company, Pass & Seymour, Inc., Trumbull Electric Manufacturing Company, and Wagner Electric Corp.

W. F. Brower serves the firm as secretary and treasurer and A. C. Bangs is service manager.

The Brower Electric Supply Company's new building consists of a first floor and basement with a total of 16,000 square feet of floor space.

The new building has many features which make it particularly convenient for a wholesale electrical establishment. The shipping department is closed by means of a wide sliding door which will permit the largest trailer truck to back into the building for loading and unloading. Along the wall to the right of this truck entrance are conduit racks, which permit loading directly to the trucks.

It was not feasible to build a loading platform without increasing the height of the entire building therefore the elevator facing the truck entrance was designed so that it could be raised above floor level. Whenever any heavy material must be loaded or unloaded, the elevator can be raised to truck floor height thus permitting transfer of the material without lifting.



The new building recently completed for Brower Electric Supply Co., Greensboro, N. C., was designed especially for wholesale service. Formal opening was well attended by dealers and contractors. . .

In the front of the building, a large customers' counter and adequate display space have been provided. Another feature of the show room is a packing counter and smaller counter located just to the left of the trucking entrance. If a customer desires something heavy such as conduit, he need not come through the front door but can be waited on conveniently at the side counter near the truck entrance.

The offices and display room are well lighted with the very latest types of indirect and semi-indirect lighting units. The bins are lighted by a special type of stock lighting unit and the stock room in the rear, as well as those in the basement, are lighted by standard types of reflector units.

The front of the building is particularly attractive at night when the glass brick on each side of the doorway and display window is illuminated from the rear by means of Climax reflectors using daylight and amber lamps.

A number of factory representatives were present at the formal opening and many of them featured interesting displays of their equipment. The opening was well attended, also, by retail appliance dealers, electrical contractors and others of the electrical industry.

Unusual Handling Of Range Installations .

(*Continued from page* 6)

incentive to do the best they can. Each truck is equipped with the best tools and equipment that can be obtained and they are kept in good condition. Sloppy, dilapidated equipment makes for the same kind of work and discourages efficiency. It is natural for a mechanic to think, "If the boss doesn't care, why should I?"

Since this discussion is intended to point out what can be accomplished toward reducing costs on small wiring jobs by specialization and standardization, a recital of our dollar and cents costs or selling prices would be of little value, because they might be too low for one community and too high for another depending upon the code requirements and job specifications.

The question at issue really is: to what extent can the cost of small wiring jobs to be done in accordance with a given set of specifications at a given wage scale for electricians be reduced if they are handled on a quantity basis so as to permit of standardization and specialization? If it were possible for the code requirements and the specifications for electric range installations as well as central station policy throughout the country to be standardized, a great deal could be accomplished toward reducing the installation cost of this popular appliance.

Wiring Specifications

In order that you may make a comparison with your own community, the specifications in Youngstown and vicinity at present for a complete range installation in a single family dwelling are as follows:

"Run 2 No. 6 R.C. and one No. 6 bare conductors in 1" electrical metallic tubing from service entrance fitting not less than 15' above the ground level at street side of building nearest company's nearest pole through outside meter socket to 60-amp, three-pole S/N safety switch and distribution cabinet with 60-amp range circuit and four 15-amp branch circuits.

"Ground neutral and equipment to water pipe or driven ground with No. 4 bare copper conductor carried exposed, but protected as much as possible on basement ceiling or wall. Put No. 4 copper jumper around water meter. Connect old lighting and appliance circuits to new distribution center by any Code approved method. Run range circuit from distribution cabinet to location of range plug receptacle in 3 No. 6 bare neutral unarmored service entrance cable."

The following material is furnished by the utility company: one piece main switch and distribution cabinet, range plug receptacle, and the meter socket. All ranges are delivered by the utility or the dealer making the sale, with cord and plug attached and are connected in the same manner as any portable appliance. All services are located at the front corner of the house which of course involves longer range runs than in communities where services are located at the rear of the house.

So far I have discussed only the reductions which can be effected in prime cost and have said nothing about reductions in overhead. Direct job supervision is unnecessary. Each journeyman is entirely capable of laying out his own work to the best advantage on jobs of this nature, and an intelligent clerk can route the orders and assign what constitutes a days work to each crew. Stock room, delivery and transportation expense are combined and cost little more than transportation alone since each truck is a traveling stock room.

Since all orders are received from the utility company and all work done is paid for by it, there is no sales expense and no collection expense. Of course in communities where a different central station policy prevails and where each range purchaser must be individually dealt with this saving cannot be made.

Our experience proves that where a sufficient number of range and water heater wiring jobs can be concentrated in the hands of one concern it is possible by specialized and standardized methods to reduce the prime cost by approximately 30 per cent as compared to the prime cost where small jobs of this nature are handled by big job methods, and where the same utility company policy prevails as in our community it is possible to reduce overhead expense by a worthwhile percentage.

What can be done with ranges and water heaters, can also be done with any other kind of small wiring jobs including small new houses. It is only necessary to find a way in each community to concentrate enough jobs of one kind in the hands of one contracting concern so as to permit of specialization and standardization.

In most communities throughout the country the business of contracting for small wiring jobs of every nature has passed into the hands of journeyman contractors, who because they are willing to operate without profit as well as, knowingly or unknowingly, to absorb their overhead in their wages, can and do install these small jobs at prices to the public so much lower than those which must be charged by contractors who employ labor and conduct a business as we understand the term, that the contractor who is an employer has been completely eliminated from that field, and his employees with him.

Large Volume of Small Jobs

There are no reliable statistics available as to the volume of business which exists in these small jobs. Any figures which have been compiled are merely guesses. My guess is that if we had accurate figures we would be astounded at the size of the total. If we are ever to secure this volume we must find some way of reducing our cost so as to at least approach the price at which the journeyman contractor can operate and we will never do that as long as we try to use the same methods on small jobs as we do on large ones.

I know you are thinking, "Yes, costs on small jobs can be reduced by specialization and standardization but how is it possible for one concern to get enough of that kind of volume to start with to be able to specialize and standardize?" Well if I was sure that I had the right answer to that I probably would be using it.

One way might be to take a page from the automobile manufacturers book and establish the selling price based on an estimated sales volume and then go out and sell that volume or go broke trying. But selling is the thing we don't seem to like to do. The electrical contracting industry has

(*Continued on page* 56)

MANUFACTURERS' News

Easy Distributors Meet To Hear 1939 Plans . .

Distributors of the Easy Washing Machine Corporation met in Syracuse on September 28th and 29th for presentation of the new 1939 line of Easy washers and ironers and to be told about the company's merchandising program for the introduction and sale of these models. The meeting was conducted by Morton Gilde, general sales manager of the Easy Corporation.

Of special interest was the company's introduction of a new Spiralator Spinner model to sell for $20 less than any price ever before offered on a similar combination of features. This machine was heralded as an important further advance in Easy's plan for a higher retail unit of sale, with the advantage of greater dealer profit.

Great interest was also evidenced in Easy's new line of 1939 ironers—particular enthusiasm being indicated for the new model 139, which embodies Easy's special feature of 3-speed control.

The featured advance in the washer line was the process of "Rubber-tection" for the lower priced Easy Turbolator models and "Permatection" for the top line Spiralator models.

Rubber-tection is a recently developed Easy process for molding rubber washer vanes around brass-plated steel frames. The advantages claimed for this process are: greater efficiency and greater gentleness as a result of the unusual resistance of the rubber vanes to the corroding effects of strong washing solutions and hard water and to the abrasive effects of sand, grit and other hard particles commonly found in the ordinary washing.

Perma-tection is an interesting new Easy process now disclosed for the first time, through which the curved metal vanes of the Easy Spiraltor washing device are given a glossy, glass-like, smooth surface that is likewise impervious to corrosion and abrasion.

Emerson Electric Co. Elects New Officers .

Numerous changes have been announced in the officers and department heads of Emerson Electric Manufacturing Company, St. Louis, Mo., effective October 1. W. Stuart Symington has been elected president and general manager to succeed Joseph Newman, who will continue, however, as chairman of the board until January 31, 1939.

Raymond E. Otto has been named manager of motor sales replacing L. F. Blough, vice president, who resigned April 30, 1938. E. L. Splitstone has been appointed chief engineer replacing J. A. Rodgers who resigned April 30, 1938.

Oscar C. Schmitt, will continue as vice president in charge of fan and motor sales, and John Wright continues as manager of fan sales.

President Honored By P. A. Geier Co. . .

Honoring the 25th year of service of their president, Arthur H. Zirke, the P. A. Geier Company, Cleveland, Ohio, manufacturers of Royal vacuum cleaners, have announced a special "Silver Anniversary" drive on Royal vacuum cleaners during the month of November. Every effort is being made to make the Royal vacuum cleaner sales record during November a fitting marker for the 25th anniversary of Mr. Zirke's association with the company.

Mr. Zirke first became associated with the Geier Company in 1913 in the accounting department and was rapidly promoted through the offices of office manager and credit manager, and in 1927 was made assistant treasurer. In 1934 Mr. Zirke was made vice president in charge of sales and advertising, and early in 1935 he was elected president of the company. Later that year he was named president of the Continental Electric Company, Ltd., of Canada, the Canadian subsidiary of The P. A. Geier Company.

Lamp Manufacturers Offer New Type Mazda Lamp .

A radically new type of Mazda lamp which includes an efficient reflector inside the bulb has been announced simultaneously by the Westinghouse Lamp Division of the Westinghouse Electric & Manufacturing Company, Bloomfield, New Jersey, and the Incandescent Lamp Department of General Electric Company, at Nela Park, Cleveland, Ohio.

These new lamps are made with a flared bulb, coated on the inside of the flare with metal, which takes and retains a high polish and directs the light of the filament in a power-

Distributors of the Easy Washing Machine Corp. gathered in Syracuse for presentation of the 1939 models.

ful beam of light. The efficiency of the directed light is high because the reflector has the accurate shape of a modified paraboloid and the filament is precisely positioned with relation to the focal point of its reflector.

The lamps are for use primarily in show windows but will find many other uses wherever a self-contained unit of this character is required. They are equipped with a medium screw base fitting the ordinary socket and can be installed and removed with ease, an important factor when displays are changed frequently. The lamps are rated 150 watts and are available for 110, 115 and 120 volt circuits. The rated life is 1000 hours, the same as the standard 60-watt Mazda lamp for household use. They may be used with color screens when colored light is desired. The lumen maintenance is particularly good. For many applications it is expected that these lamps will often be used with flexible adapters now on the market.

News About People—

The appointment of H. M. Butzloff as sales manager of the Household Refrigeration Department has just been announced by R. C. Cosgrove, manager of that department for the Westinghouse Electric & Manufacturing Company. Mr. Butzloff was formerly household refrigeration

supervisor of the northwestern district and was located at the Westinghouse district office in Chicago. He has been connected with the Westinghouse Company for the past five and a half years and has spent all of his time in refrigeration activities. His office will be maintained at the company's merchandising division headquarters at Mansfield, Ohio.

Previous to his affiliation with Westinghouse, Mr. Butzloff spent eleven years as an executive of the Stover Company in Chicago and with the Electric Equipment Company of Davenport, Iowa, both electric refrigeration distributors.

* * *

Announcement has just been made by the Standard Transformer Company, Warren, Ohio, of the appointment of J. P. Voight, Summerville, S. C., as representative for the company in the states of North and South Carolina and the eastern section of Tennessee.

* * *

Friends of A. Mortimer Orlick, who represents the Leviton Manufacturing Company, Brooklyn, N. Y., in the southeastern territory, will

probably have to look twice to identify him in the above photograph. Paul Ramsey, southern manager, of Arrow-Hart & Hegeman Electric Company, to whom we are indebted for this snapshot, assures us that it is not a "greaser" but Mr. Orlick, himself.

* * *

Ernest T. Lloyd, 103 Walton Street, Atlanta, well known sales agent, has been appointed representative for the Tape Division of Okonite Company, Passaic, N. J. Another line recently assumed by Mr. Lloyd is that of the Anderson Brass Works of Birmingham. He will represent both of these accounts in the Southeastern states.

The "Princess" Model Added To Westinghouse Range Line

A new popularly priced range model, the "Princess" has been added to the regular 1938 line according to a recent announcement made by the Westinghouse Electric & Manufacturing Company. Finished in gleaming white porcelain enamel, the new range possesses styling and beauty and offers the advantages of

STEEL STRAND ✣ TELEPHONE WIRE
Crapo
GALVANIZED PRODUCTS
SCIENTIFICALLY MADE TO RIGID SPECIFICATIONS
Crapo Galvanized Steel Strand is a highly specialized product scientifically manufactured under direct laboratory supervision. Each grade and size is produced from start to finish to meet the exacting demands of the service for which it is intended. Each wire used in forming a particular size and grade is made from the same special steel, processed in the same way, and galvanized by the Crapo Process.
For further information consult the nearest distributor of Crapo Galvanized Products, or write direct!
INDIANA STEEL & WIRE CO.
Muncie, - - Indiana

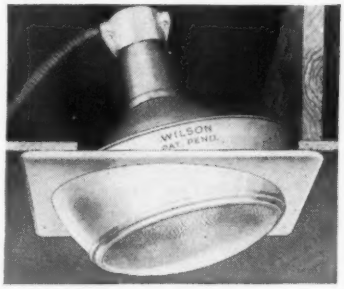
the three-heat Corox surface units and large oven to this low-priced range.

Features include a solid one-piece platform and backsplasher construction, completely enclosed Corox surface units and a well-type Economy Cooker that provides fast economical cooking facilities. The large oven has lock-stop racks, two oven units and is equipped with an enameled broiler pan. A utensil storage drawer of ample capacity is located under the surface units.

This new model is available with conventional legs or with a two-door base cabinet placed under the range providing a "built-to-the-floor" construction and additional storage space for utensils and accessories.

Recessed Lighting Unit With Universal Adjustment . .

Illustrated below is the new lighting unit for stores which gives high-intensity supplementary illumination for important counters and displays. The unit is called the adjustable recessed concentrator because it recesses flush with the ceiling to harmonize with modern lighting in-



stallations, yet offers the advantage of universal adjustment for directing the light exactly where desired.

The unit is especially suitable for locations where light must be projected at an angle for better illumination of vertical surfaces.

The concentrator is the latest addition to the large line of recessed reflectors made by Wilson Lighting, Inc., Chicago, Ill.

Smaller A-c Magnetic Switch Announced By General Electric

A new a-c magnetic switch (CR7006-D51) has been developed by General Electric for full-voltage starting of single-, two-, and three-phase motors. While it is small and compact, it has been designed in full accordance with established standards of electrical clearances, mechanical strength, and ratings. Its principal features, in addition to its small physical dimensions, are its conservative electrical design, long mechanical life, and low maintenance costs over a long period of time.

Basically, the switch consists of a line contactor, with interlock to provide undervoltage protection, and two isothermic temperature overload relays to protect the motor against overheating. These elements are

WHY CARRY DUPLICATE INDOOR AND OUTDOOR INSTRUMENT TRANSFORMER STOCKS?

Use your indoor instrument transformers on either inside or outside jobs. House them in SUPERIOR Instrument Transformer Enclosures.

Cat. No. IT-324612 SUPERIOR Instrument Transformer enclosure for six transformers is 32″ wide, 46″ high, 13″ deep.

Three standard sizes — Special sizes too.

Just ask for Bulletin No. 377.
We'll carry the ball for you from there on.

Superior Switchboard & Devices Company
CANTON, OHIO

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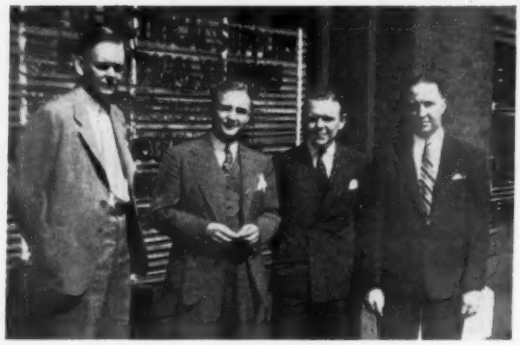
mounted in a general-purpose sheet-steel enclosing case. The open-type switch is furnished with a rigid mounting plate to permit easy mounting on either an insulating or a conducting panel.

New Bull Dog Main Service Equipment .

Bull Dog Electric Products Co., of Detroit, announces a new line of main service equipment, the 64300 series having 30 amp. main switch and from 2 to 8 branch circuits, and

the 66200 series with 60 amp. main switch and from 2 to 12 branch circuits.

Both of these series are the result of re-design to secure finer appearance and greater compactness with more wiring room. The new main SAFtoFUSE switch heads are made of Bakelite. More knockouts in more convenient locations have also been provided. The new Snap-in gutter cover which dispenses with holding screws is also a feature on items having 4 branch circuits and less. Wiring terminals are of the solderless type for quick, easy and economical wiring. All plug fuse receptacles will accommodate non-temperable fuses. The 60 amp., type 66200 series having branch circuits, are equipped with 60 amp. sub-lugs. Where desired, these sub lugs could serve as the mains, leaving the SAF toFUSE switch unit available for range or other additional circuit.



In Memphis for a visit recently with their distributor, Riechman-Crosby Co., were J. B. Greer (left) territory salesman of the Birmingham office, Appleton Electric Co., of Chicago, Nels Tornbolm, engineer, and W. J. Whitfield, general sales manager, both of Appleton Electric Co. also. At right is H. S. Wright, manager of Riechman-Crosby's electrical department. . .

Stockbin Illumination Subject Of Goodrich Booklet . . .

"Light on the Subject of Stockbin Illumination" is the title of a new 12-page booklet answering the heretofore difficult problem of providing adequate illumination for shelves and bins in narrow aisles. Profusely illustrated and complete with engineering data, this bulletin shows many interesting examples of how the problem of narrow aisle illumination is correctly solved. Copies may be obtained directly from the Goodrich Electric Company, 2900 No. Oakley Avenue, Chicago, Ill. Ask for Bulletin No. 91.

Uptegraff Catalog Features Instrument Transformers .

R. E. Uptegraff Manufacturing Company, Pittsburgh, Pa., have just issued a new 32-page catalog on current and potential transformers, designated as Bulletin No. 108. The book is illustrated with the various types, and it contains detailed information and prices. A copy may be had by writing the manufacturer.

Small Parts Bins Solve Service Man's Problem

A neat, compact, efficient and low cost means for keeping track of screws, bolts, nuts, studs, washers, clips, contact points, tinsel, springs, brushes, fuses and the innumerable small parts required in the production and servicing of electrical equipment is provided by Add-A-Bin, introduced by the Noggle Products Company, Ann Arbor, Michigan.

This is a system of unit bins sold separately and assembled by the user to fit his individual needs. The bin housing may be screwed to a wall or to a panel which may be fashioned into a portable kit. A bin may be opened for removal of a single item

THOUSANDS OF RURAL AND SUBURBAN RESIDENTS
WILL BUY
ELECTRIC WATER SYSTEMS
DURING THE NEXT SIX MONTHS

Appliance Jobbers and Dealers are adopting BURKS Super Turbine Water Systems and cashing in on the opportunity for added profit made possible by the extension of rural electric lines.

RUNNING WATER provides the Farmer —the most in conveniences.

RUNNING WATER means modernization therefore the sale of other appliances.

THE FAMOUS
BURKS
WITH
"ONLY ONE MOVING PART"
enjoys a world wide reputation for unmatched quality and unequalled performance.
The BURKS is acclaimed by thousands of satisfied users for its patented exclusive features.
You too—can increase sales and profit by immediately taking advantage of this opportunity to adopt the BURKS line for distribution in your territory.

RUNNING WATER is the greatest labor saver known to man.

WRITE
For information how you can make BURKS line show a handsome profit — Your territory may still be open.

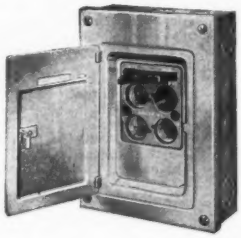
DECATUR PUMP COMPANY • DECATUR, ILLINOIS

SUPER NIAGARETTE WATER SYSTEM
for shallow wells up to 28 feet of water

and it is so delicately balanced that the weight of its contents, no matter how light, causes it to close automatically when the mechanic's hand is removed. If, when open, the bin is lifted slightly, it will lock open. Or it may be lifted higher, pulled out and down and remains open horizontally for cleaning. Or it may be removed entirely from the housing.

New Colt-Noark Line Of Fuseless Main Switches .

A new line of Colt-Noark Fuseless Main Switches has just been announced by Colt's Patent Fire Arms Manufacturing Company, of Hartford, Conn. These new units provide up to 6 branch circuits.



They are furnished in both long and short cabinets, the long cabinets providing space for both transformer and Despard Type switches. The entire interior mechanism is easily removed to facilitate wiring.

Both surface and flush type cabinets are furnished, the latter having plastic adjustment, for 30 ampere, 120-250 volt service with solid neutral. Cabinets have front operated Rotor Disc switches.

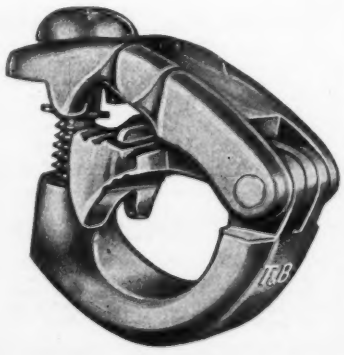
The new Colt-Noark Catalog No. 60-S contains complete information. A copy will be sent upon request.

One-piece Connector Available From Thomas & Betts Co. . .

A new, universal type, combination tee, parallel tap is being offered by The Thomas & Betts Co., Elizabeth, New Jersey.

The fitting, in three body sizes, takes any type of wire, cable or tubing from 1/0 to 500 MCM on the main and No. 14 to No. 4 on the branch.

The tap is identified by the trade name "Hinjon Junior." The manufacturer points out that the tap is of



Put Efficiency in

YOUR CABLE PULLING

With the GREENLEE

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Portable

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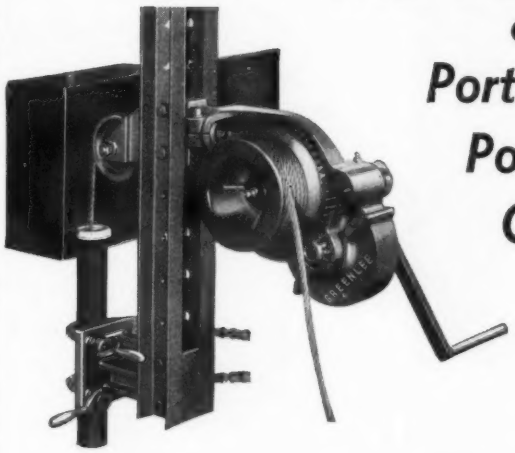
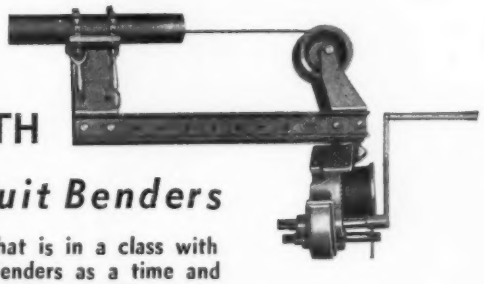


Left: Pulling into a box from vertical section of conduit.

Below: Pulling from end of horizontal section of conduit.



IN A CLASS WITH

Greenlee Conduit Benders

Here is a new cable puller that is in a class with Greenlee Hydraulic Conduit Benders as a time and labor-saving device. It is easily clamped right to the conduit through which cable is to be pulled, preventing the loosening of hangers. The drum can also be used as an ordinary winch, since a base is provided on it for bolting to a plank. Provision is made for two operators, when required. Weighs only 170 pounds, and tension drum can be quickly removed for easier portability. Let us tell you more about it.

OTHER GREENLEE TIME AND MONEY SAVERS include Hydraulic Conduit Benders—Hydraulic Pipe Pushers—Knockout Punches and Cutters—Radio Chassis Punches—Joist Borers—Electricians' Bits—Bit Extensions. Use the convenient coupon for complete information.

GREENLEE TOOL CO., 1707 Columbia Ave., Rockford, Ill.

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GREENLEE TOOL CO., 1707 Columbia Ave., ROCKFORD, ILL.
Please send information on the following tools:

☐ Cable Puller ☐ Conduit Benders ☐ Pipe Pushers ☐ Knockout Tools
☐ Radio Chassis Punches ☐ Joist Borer ☐ Electricians' Bits ☐ Bit Extensions

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My Jobber is ---------- E. S. 11-38

Solder Joints Are "Out"

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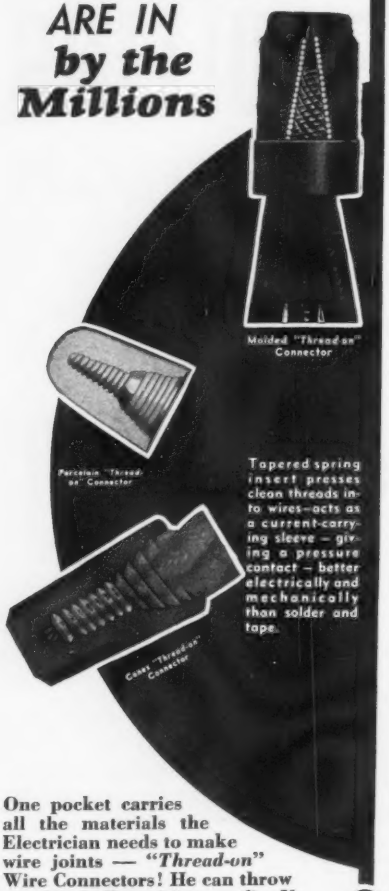
ARE IN

by the Millions


Molded "Thread-on" Connector
Porcelain "Thread-on" Connector
Tapered spring insert presses clean threads into wires—acts as a current-carrying sleeve—giving a pressure contact—better electrically and mechanically than solder and tape.
Conex "Thread-on" Connector

One pocket carries all the materials the Electrician needs to make wire joints — *"Thread-on"* Wire Connectors! He can throw out his bulky wiring outfit. No more fuss or bother.

No	Solder	Soldering Iron
	Friction Tape	Solder Cups
	Rubber Tape	Smoked Ceilings
	Flux	Burned Woodwork
	Twisting of Wires	Shorts
		Loose Connections
	Blow Torch	Fire Hazards

Each *"Thread-on"* Connector is a *single piece* and the only material needed to make a joint except the wire. No screws or other parts to get lost—no special tools needed.

EASY APPLICATION. — Just twist *"Thread-ons"* on the bared ends of wires like a nut on a bolt—that's all!

BETTER JOINTS, TOO.—Stronger mechanically, better electrically.

SAFETY.—*"Thread-ons"* are safe for the workman, safe for the work and safe for the structure in which it is done. Permanent.

FULLY APPROVED.—Listed by Underwriters' Laboratories, Inc., Electrical Inspectors, Architects, Owners and by the thousands of Contractors and Electricians who use them.

MILLIONS IN USE!

Write for Samples

BRYANT ELECTRIC CO.,
Bridgeport, Conn.
("Bryant" Connectors)

IDEAL COMMUTATOR DRESSER CO.
Sycamore, Illinois
("Ideal" and "Excel" Connectors)

WEISS & BIHELLER MDSE. CORP.,
584 Broadway, New York, N. Y.
("Simplex" and "Conex" Connectors)

WIREMOLD COMPANY,
Hartford, Conn.
("Wiremold" Connectors)

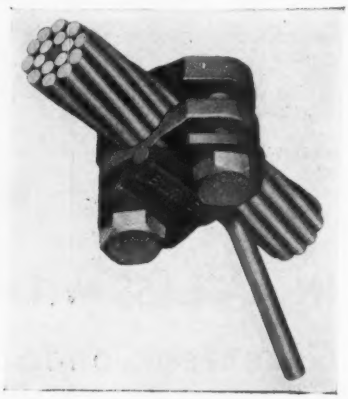
one piece construction, there being no loose parts. The range of the three body sizes on the main, is 1/0 to 4/0; 4/0 to 300 MCM, and 300 to 500 MCM. The range of the branch is the same on all three sizes,, namely No. 14 to No. 4.

The tap is only slightly larger than the cable, over insulation, and therefore, can be quickly and neatly taped. It is cast of high conductivity copper alloy and is listed and approved by Underwriters' Laboratories.

The manufacturer has announced a willingness to send a sample without charge to anyone interested.

Burndy Armor Rod Clamp Connector Introduced . .

The widespread use of A. C. S. R., and galvanized conductors, particularly in rural electrification, has indicated the need of a connector especially adapted for taking copper and galvanized taps from A. C. S. R. over the armor rods. The type BPG Armor Rod Clamp, recently introduced by Burndy Engineering Company, Inc., New York, N. Y., answers this requirement with a high degree of compactness, safety and efficiency.



The connector consists of three clamping elements held in place by two bolts and so arranged that the five parts constitute virtually a single piece.

The design of the Armor Rod Clamp permits the aluminum armor rods to bear against a galvanized surface, and the copper tap to bear against a copper surface. A constant spring pressure is maintained between conductors, thereby providing a permanently secure connection.

Outdoor-Type Indicating Secondary Fuse . . .

A new outdoor-type, indicating secondary fuse has been announced by the General Electric Company for transformer secondary protection or banking and isolating service-entrance faults. Corrosion resisting materials are used throughout and the fuse-link is totally enclosed in a compact housing of Textolite.

The internal fuse assembly is held under constant tension by a compression spring which exerts an outward pressure on the retaining collars. Thus positive operation and indication are assured, even at the lowest currents capable of melting the pure-tin fusible element. The Textolite enclosing tube, however, is entirely free from spring pressure; and a strain wire shunted across the fusible element relieves it of mechanical stress.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUG. 24, 1912, AND MARCH 3, 1933

Of Electrical South, published monthly at Marietta, for October 1, 1938.

State of Georgia, County of Fulton.

Before me, a Notary Public in and for the State and County aforesaid, personally appeared J. C. Martin, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the Electrical South, and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publicaton, for the date shown in the above caption required by the Act of August 24, 1912, as amended by Act of March 3, 1933, embodied in Section 537, Postal Laws and Regulations, printed on the reverse side of this form, to-wit:

1. That the names and addresses of the publisher, editor and business manager are:
Publisher, W. R. C. Smith Publishing Co., Atlanta, Ga.
Editor, Carl W. Evans, Atlanta, Ga.
Business Manager, J. C. Martin, Atlanta, Ga.

2. That the owners are:
W. R. C. Smith Publishing Co., Atlanta, Ga.; W. R. C. Smith, Atlanta, Ga.; J. C. Martin, Atlanta, Ga.; O. A. Sharpless, Atlanta, Ga.; T. W. McAllister, Atlanta, Ga.; W. J. Rooke, Atlanta, Ga.; W. S. Cushion, Cleveland, Ohio; E. W. O'Brien, Atlanta, Ga.; J. C. Cook, Atlanta, Ga.

3. That the known bondholders, mortgagees and other security holders, owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: None.

4. That the two paragraphs next above giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security company but also in cases where the stockholders or security holders appear upon the books of the company as trustees or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company, as trustee hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than so stated by him.

J. C. MARTIN,
Business Manager.

Sworn to and subscribed before me this 11th day of October, 1938.

E. L. PHILPOT,
Notary Public at Large.

My commission expires March 7, 1939.

ELECTRICAL ESTIMATE BLANKS

(fine for estimating on FHA jobs), Time Sheets, Job Tickets, and other useful printed forms for Electricians our specialty. Reasonable prices which include delivery. Prompt attention to inquiries and orders. Write for free samples.

Specialty Printers

138-44 Elm Ave. Laurel Springs, New Jersey

MR. APPLIANCE JOBBER

After all—its profit you want. Farmers in your territory are buying Water Systems—Why shouldn't you sell them through your Dealers—See BURKS ad on page 52. Don't delay—act now.

Louisiana Code School Proves Successful .

(*Continued from page* 45)

trical Code as the city ordinance, for without it there will be no standard for electrical construction and veritable chaos will be the result.

The proper attitude, if any Code requirements appear to be distasteful, is to make some effort to change the Code. There is provided ample machinery for changing the Code and, as with any other regulations, popular opinion is the most effective method. Whenever any regulation is not supported by the majority of the people, it automatically becomes ineffective.

Washington Dealers Launch Range Sale

(*Continued from page* 43)

paign of The Electric Institute of Washington.

For the campaign period of four weeks, Institute members featured "A Fifteen Dollar Allowance for Your Old Stove Toward the Purchase of a Modern Electric Range." Amortization of this allowance was divided as follows: regular $5.00 bonus payable by the Institute; additional $7.50 trade-in participation by the Institute; and $2.50 absorbed by dealer.

Special promotional materials for the campaign included:

Window streamers announcing the $15.00 trade-in offer, available to all dealers without cost.

Triple-fold stuffer pointing out that 15,000 Washington families now enjoy electric cooking, and inviting a visit to the store of an Institute member.

Single-fold stuffer featuring simply the trade-in allowance.

Cooperating with the Institute, the Potomac Electric Power Company ran a series of advertisements in all Washington newspapers, based on case histories of range users. The advertisements included statements by the housewife, a reproduction of a typical monthly bill, and a list of the electrical appliances used in the home. This material was built into a powerful sales message for electric cooking.

What Do You Know About Motors? . .

These are correct answers for the "True or False" statements listed on page 40.

(1) *False.* The shorted coil is cooler, its resistance is lower, and the I-squared-R losses lower.

(2) *True.* As the number of active bars must be an odd number, adding one results in a progressive, and subtracting one, in a retrogressive winding.

(3) *False.* The rotation in a motor, and the brush polarity in a generator, will be reversed.

(1) *False.* For six-pole wave windings the number of bars plus or minus one, must be divisible by three. It can't be both in any one case.

(5) *True.* The resistance of copper increases as its temperature increases.

(6) *True.* All turns of one phase are in series, whereas with star connections the turns of two phases are across any two lines.

(7) *False.* Copper is too soft, resistance too low for minimum eddy current losses, surfaces should be cleaned and tinned. Best material is thin, .012" or .022", tinned sheet steel.

(8) *False.* A single coil with crossed leads can only be detected by establishing a flow of direct current through the winding and checking each slot with a compass.

(9) *False.* Paraffin prevents adhesion between coil and core iron, and entrance of varnish. Brush coil sides or slots with a baking varnish.

(10) *False.* Such tie clips convert the bands into miniature squirrel cage windings, producing eddy currents and hot bands.

(11) *True.* When stripping an armature from a modern motor check the methods of banding and kind of wire to avoid trouble on rewinds.

(12) *True.* A narrow drift used on a tight coil will result in cracked coil insulation. A long drift prevents bent slot sections.

(13) *True.* Flat, wide steel drifts require less pounding to set or shape the coil ends. When used flat and kept smooth, they will not damage insulation.

(14) *True.* If the fused section is large, eddy currents will attract the test steel strip. In service the core will heat at these points because of eddy currents and increased magnetic density.

(15) *True.* This results in all slack being forced away from the coil. If bands are applied towards the core, short circuits are likely to occur by the leads being jammed against the coil.

(16) *False.* Most lap windings are of the progressive type as it is necessary to cross the top and bottom leads on lap windings to form a retrogressive winding.

(17) *False.* Running steel banding wire through clamps heats the wire, reduces its tensile strength, and softens it. Modern

C. B. ROGERS
ELECTRICAL HEATING ENGINEER
CHROMALOX
ELECTRICAL HEATING UNITS
and
CHROMALOX
EQUIPPED PRODUCTS
1000 PEACHTREE STREET
ATLANTA, GEORGIA

Smart dealers are reaping profits selling Coolair fans for new homes.
AMERICAN COOLAIR CORPORATION
Jacksonville, Fla.

banding machines use tension wheels, not friction clamps on the wire.

(18) *True.* Lifting the extra coils imposes less strain on the throw coils and permits installing the last coils with less trouble and damage.

Unusual Handling Of Range Installations .

(*Continued from page* 48)

too many managers, too many engineers, too many superintendents, too many mechanics and *too few salesmen.*

We have become so accustomed to having our selling done by some other branch of the electrical industry or by some other industry that we think they should keep right on doing it and turn the wiring over to us at nice profitable prices. We not only don't want to do any selling ourselves but we don't like to employ salesmen either. If fifty per cent of the contractors could be induced to take jobs as salesmen for the other fifty per cent a large volume of business would be created and all concerned would make money including most of the contractors who became salesmen.

While we have to give the other branches of the electrical industry credit for doing some of our selling we also have to give them credit for increasing our costs, and the strange thing about that is, that the interests that make the loudest demands for lower wiring costs are the same ones who have done the most to increase costs.

The National Electrical Code recognizes and approves seventeen different types of wiring. Each type requiring its own peculiar kind of materials and fittings. In addition to this each manufacturer of any of these types of material, with few exceptions, has his own peculiar designs which further tends to prevent standardization. The electrical construction industry has no more economic justification for seventeen different types of wiring than I would have for seventeen wheels on my car, and I have trouble keeping tires on four of them.

It seems that every time a manufacturer thinks he isn't getting his share of the business he develops a new type of material, gives it some kind of a ridiculous sounding trade name and then cries in a loud voice that its use will reduce the cost of wiring. Then by some magical process he gets it recognized in the Code.

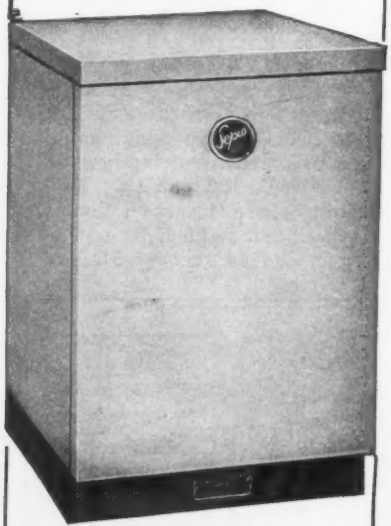
The next move is to continue the magic and the noise about reducing wiring costs until he gets some of the major utilities to recommend its use to contractors. After that we have another type of wiring material, but its cost installed on the job is always about the same as that of some other type which we already had. When its all over, nothing has been accomplished except an increase in our costs by reason of everyone along the line having to handle an additional type of material and by the further prevention of standardization.

Another way in which the other branches of the electrical industry have helped to increase our costs is by encouraging more and more persons to engage in business as electrical contractors. Unfortunately most of these propose to become journeymen contractors and are without capital or training or experience in business management.

Sometimes this is done to make another customer and sometimes with the mistaken idea that the more contractors there are the more wiring will be sold or that the more competition there is the lower the prices will be. Neither of these objectives are ever attained because this contractor can't afford to spend any time selling. In order to live he must have a contract right away, a contract at any price or under any conditions and the quick way to get it is by being the lowest bidder on the first job that shows up.

The price is not really reduced because when this contractor can't pay the manufacturer or wholesaler the credit loss is passed on in the form of higher prices to those who do pay. The existence of several times as many contractors as there is any economic justification for, makes it im-

SEPCO
TABLE TOP MODEL



with Porcelain FRONT as well as TOP—to permanently match other kitchen appliances.

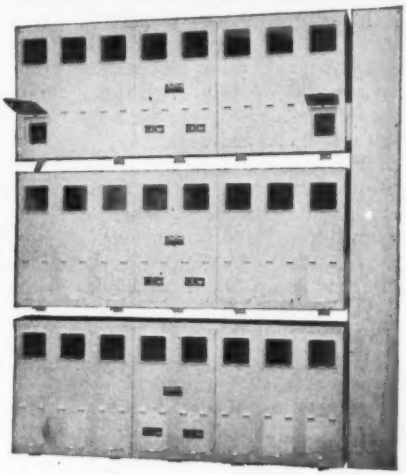
AUTOMATIC ELECTRIC HEATER CO., Inc.
Pottstown, Pa.
Southern Division Headquarters:
P. O. Box 1707. Birmingham, Ala.

MR. APPLIANCE JOBBER

If you are interested in increasing sales and profit see the BURKS ad on page 52 and write for full particulars.

St. Louis
requests the pleasure of your company at the
HOTEL
Mayfair
8th and ST. CHARLES
50% OF ALL ROOMS, $3.50 OR LESS, SINGLE
$5.00 OR LESS, DOUBLE

PROTECTED Meter Profits!



WALKER Gang Metering Cabinets

. . . offer positive protection for your meters against tampering and current theft . . seal in your profits for all time!

. . . also cut material and labor costs on installations by affording a neat, compact, time-saving means of mounting all your meters and customer switches together in one spot, with bus-bar mains and connecting troughs already in cabinet.

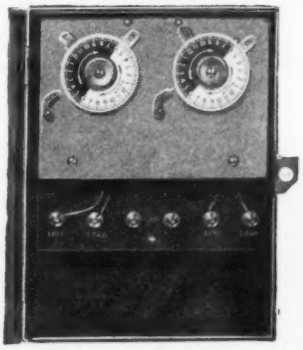
Cabinets can be furnished in steel or aluminum . . horizontal or vertical style, up to any number of gangs you wish. Types for both indoor and outdoor service. Cabinets also built to specifications.

Write for Catalog.

ILLUSTRATED: 24 Gang Panel . . three horizontal totally enclosed weatherproof, tamper proof cabinets with meter boxes and customer switches as a unit. Connecting bus trough attached. Glass faces permit readings without removing covers. Plenty of wiring space.

WALKER ELECTRICAL COMPANY

Atlanta, ——— Georgia



AUTOMATIC "TWIN" TIME SWITCH WITH TWO SEPARATELY-CONTROLLED CIRCUITS $22.50

Two Time Switches in one! Two circuits of 20 amperes each, with individual time controls. Ideal for controlling night lights in apartment house halls. Ideal for operating electric signs and window lights from one switch, at different times, etc.

Write for Information.

AUTOMATIC ELECTRIC MFG. CO., Mankato, Minn.

CARPENTER LIGHTS

Announce Type "T&T"

YOU OWE YOUR MEN THE BEST THERE IS

FASTER-BETTER LINE REPAIRS

10' SPREAD ATOP A 40' POLE OR A 20' FLOODLIGHT CIRCLE

Uses 2 No. 6 Dry Cells

Most Powerful Made

Sent on Approval

CARPENTER MFG. CO.
Cambridge, Mass.

UPTEGRAFF TRANSFORMERS

UPTEGRAFF Transformers have the highest efficiency, the lowest impedance and therefore the best regulation, and the most rugged construction of any transformers on the market.

Utility or industrial engineers who have not had Uptegraff Transformers installed, have not experienced the best that is built in Transformers.

The Uptegraff line includes all types of Transformers, and in capacities up to 5,000 KVA. Every Uptegraff Transformer is guaranteed in material and workmanship for one year.

Bulletin No. 105 gives information on Uptegraff Distribution Transformers — furnished 25 or 60 cycles; up to 500 KVA.

Uptegraff Standard Distribution Type Transformer. Equipped with Stud Terminals with Primary Bushings, gapped: Dial Thermometer, Oil Gauge, Drain Valve, Ground Connection and Breathers. Every Uptegraff Transformer is complete with all necessary accessories.

R. E. UPTEGRAFF MFG. CO.
300 N. Lexington Ave., Pittsburgh, Pa.

possible for any but a few to secure enough volume to permit of efficient operation and since the overhead ratio of most contractors is already out of line they think they can't afford to spend anything to promote sales.

Unfortunately a mistaken idea often prevails among the customers of our industry, some of whom are members of some other branch of the electrical or the construction industry, that a contractor who operates on a small scale without equipment has a lower overhead than a contractor who is adequately equipped. All of the statistics of our industry go to prove that within reasonable limits the larger the volume the lower the overhead rate per dollar of business transacted.

During the last few years bigness in business has had a lot of criticism from high places, but the electrical contracting industry like all branches of the construction industry need have no fear of being criticized because its business units are too large. It does however deserve criticism because they are too small.

A business can be too large to enable it to operate efficiently with reasonable profit to its owners and with due regard for the public interest. A business can also be too small to permit of this kind of operation. So far as size is concerned there is a reasonable minimum and reasonable maximum.

In my opinion, in order to reduce the cost of electrical installations to the public and at the same time to protect the profits and the capital of the industry, it is the duty of all branches of the electrical industry including labor to work together for the purpose of encouraging and making possible more specialization, more standardization and more creative selling in the electrical industry.

Burndy announces type KPA 28 — a recent addition to the SCRULUG line. This handy, sturdy connector takes cables from 1/0 str. to 4/0 str. Prices on request.

BURNDY
ENGINEERING COMPANY, Inc.
459 E. 133d St., New York, N. Y.

Distribution Transformer Maintenance Practice

(*Continued from page* 36)

ing fluid, the loose paint scraped off, and the tank painted. During the last several years, we have been using Masury Company's primer No. 10165, and more recently, we have used Detroit Graphite No. 354 for a finish coat to paint our distribution transformers. Satisfactory results have been obtained with the primer, although it is rather expensive. The Detroit paint has not been used long enough for us to form a definite opinion.

During the last eleven years, our average yearly line transformer maintenance expense per transformer in service has been $2.68. During the same period, the yearly operating expense, which includes removing, resetting, inspection and testing of line transformers was forty-seven cents per transformer in service. The total average yearly maintenance and operating expenses are therefore $3.15 per transformer in service.

Distribution Engineers Meet In Virginia

(*Continued from page* 33)

subject for discussion at the meeting of the Standards and Specifications Group. Subcommittee reports on Line Hardware, Crossarms, and Insulators were presented.

At the joint meeting of the Transmission and Distribution and Electrical Equipment Committees, papers were presented on Street Lighting, Radio Dispatching of Trouble Crews, Basis of Investment for Increased Reliability—Service Outages, and Notes on European Practice. In addition reports were presented on Utilization Voltages, Continuing Property Records, Principles of Hold-Off, and Ratings for Registration Statements.

The overhead distribution group met Wednesday morning to hear papers presented on the following subjects: Ground Line Treatment of Standing Poles, Trees and Their Relationships to Overhead Power Lines, A Method of Apportioning Design Voltage Drops, Drops for Overhead Residential Distribution Circuits, Report on Lightning Protection of Distribution Transformers, and Field Testing of Distribution Transformers.

A closed session concluded the meeting.

MR. APPLIANCE JOBBER

Hundreds of Water Systems will be sold in your territory—This can mean added sales and profit to you. See BURKS ad on page 52—Act now.

YOUR KEY TO COMFORT

IN St Louis

HOTEL Lennox

9th and WASHINGTON

50% OF ALL ROOMS $3.50 OR LESS, SINGLE
$5.00 OR LESS, DOUBLE